The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XXXVIII. February 19, 1938 No. 973

The Falmouth Report

THE long-awaited Falmouth Report on the home production of oil from coal has now been issued, and it must be confessed that the event is something of an anti-climax. The report, in short, leaves us very much where we were. There have always been two schools of thought in this matter of the supplies of oil, that are so necessary in times of national emergency. One school believes that the Navy can safeguard our trade routes and that, provided a supply is stored against temporary emergencies, there is no need to produce at home. The other school believes that home production is essential. This report to some extent steers a middle course but, whatever leaning it has, it is on the side of those who prefer to leave the matter to the Navy. It is recollected that much British capital is invested in oil fields overseas, although these are not situated within the British Empire. The thin and vulnerable line of communication between this country and the oil fields of the world possesses no terrors for the Committee and it is held that reliance should be placed upon imported supplies coupled with adequate storage.

Many fuel technologists have urged that oil could be stored in sufficiently large quantities for capital expenditure far below the cost of plant for synthetic production of equal quantities, and this view has prevailed. Suggestions have been made for underground storage, and it has even been held that obsolete coal mines might be utilised for this purpose. Just what form storage will take is yet unknown, and is doubtless the subject of the portion of the report which is confidential and has not been published. There can be no doubt that the nation is so vitally dependent on oil that the matter cannot be allowed to drift, and if we are not to produce all our requirements synthetically, two or three years' war-time supply of oil should be stored. Whether the difficulty of storing petrol without heavy losses has been faced is doubtful, but a number of refineries could be established over a wide area and crude oil could be stored. It may be that our war-time oil requirements would be 15,000,000 tons annually; over-ground storage costs about £1 a ton in capital expended on tankage, while underground storage would be very much more expensive. The cost of purchasing the oil must be added.

The Committee has quite rightly rejected the claims of low temperature carbonisation as an important contributor to the national oil supply, on the ground that its commercial value is dependent on the market for the coke, and not on the demand for oil. A kindred industry, the Scottish shale oil industry, is viewed with more favour, and rather paradoxically, for the reason that the solid residue left in the retort is valueless. This industry has had a difficult time during the last 25 years, but with the continuance of the tariff on oil is expected to increase and, if the high-sulphur problem can be solved, may even be applied to oil shales in other parts of the country. It is recorded that the coke oven and gas industries are making their contribution to the oil problem, assisted by the tariff, but oil and benzole are purely by-products and neither can be termed an oil-from-coal industry.

If synthetic production is deemed advisable, only two processes can be considered—that of hydrogenation, and that of synthetic production from a mixture of hydrogen and carbon monoxide gases, of which the Fischer-Tropsch process is the only one upon which the Committee expressed any opinion. It seems unlikely that there will be any extension of hydrogenation for the present, and Messrs. Imperial Chemical Industries made it clear that while they were prepared to assist in developments of the hydrogenation process to the utmost limit of their power, certain essential Government assistance must be given before additions to the present installation would be possible. To-day, a plant to produce 150,000 tons of petrol annually would cost some £8,000,000.

Perhaps the two most important parts of the report refer to the tax and to the Fischer-Tropsch process. It is understood that the synthetic processes cannot operate unless protected and it is therefore proposed broadly that the tax of 8d. a gallon—a 200 per cent. protective tariff—shall be retained at least until 1950. This in itself should encourage private companies to erect synthetic oil production plants. It is this fact that enables the Committee's treatment of the Fischer-Tropsch process to be viewed with approval. No direct subsidy is proposed, except to assist research work, but the Committee feels that the Fischer-Tropsch process possesses features which demand investigation. The view is accepted that purely small-scale investigation is insufficient and the hope is expressed that private initiative will erect a plant for the production of 20,000 to 30,000 tons of primary products per annum. With the tax fixed at 8d. a gallon, the Committee's hope should be justified and a new chemical process should be added to British industry. The possibility of a home supply of diesel oil and of lubricating oil from the products of the Fischer-Tropsch process are specially noteworthy. It is of some interest to notice that per ton of product there is not much difference between the Fischer process and the hydrogenation process, but the Fischer process can be built in much smaller economic units and can be scattered about in the colliery areas, like coke oven plants, and are thus less vulnerable.

Notes and Comments

The Employer's Property

IT was recently held that it was a term of all employment that any discovery or invention made in the course of employment, during working hours and using the materials of the employer, was the property of the employer and not of the employee. This judgment was given in a case in which a chemist had discovered during his employment a process of making acrylic acid. The discovery was communicated to his employers who took no action until just before he left their employ. His subsequent application for a patent on his own account was the reason for the litigation. Extracts from the judgment given in a somewhat similar case are given on another page. Here a manager of a chemical works was alleged to have revealed his former employers' secret process to a rival firm. Both of the two cases were concerned with attempts on the part of the employee to adopt processes which belonged, at least in part, to his employer. In the latter case, the issue was clear-cut, as there was a definite agreement between the employer and employee. In so many instances it is difficult to decide what precisely belongs to the employer and what to the employee. Action in the courts can often be avoided by a careful drawing-up of the service agreement binding employer and employee under equitable terms.

Trade in January

IN spite of further expressions of uncertainty as to the future of trade which have appeared recently, the present position can give little cause for anything but satisfaction. The Board of Trade's figures for last month show no falling-off in the expansion of industry, a prevailing feature throughout last year. With an increase of over eleven million pounds as compared with 1937, the export and import figures are the highest January total trade figures for eight years. Most of the staple industries of the country are continuing to enjoy record activity. As regards the chemical trade, exports in the group chemicals, drugs, dyes, and colours, rose by £105,426 to nearly two million pounds compared with January, 1937, and by £211,780 as against the same month of 1936. Imports fell by £49,241 to slightly over one million pounds, compared with the same period last year. Thus, so far as the chemical trade is concerned, a further substantial reduction in the adverse balance of visible trade has taken place.

Report on the Typhoid Epidemic

THE report of the inquiry into the recent typhoid epidemic at Croydon, published on Tuesday, attributes the cause of the outbreak to the conditions under which constructional alterations were carried out in Addington well. One of the workmen engaged in the alterations to the well had contracted typhoid in the war and, in ignorance of the fact himself, remained a carrier of the bacillus. Further, while the work was in progress neither the filter plant nor the chlorinating apparatus, with which the well was supplied, was in use, but the water was still pumped to supply. It is quite understandable, therefore, how the contamination of the water took place. But that the filtration and chlorination treatments should have been interrupted while alterations were being carried out in the well, when it could reasonably be expected that the water would be exposed to additional sources of contamination, is unfortunate to say the least. On this point, the report states that there was both misunderstanding and lack of communication between the responsible officers in connection with the work, and the Medical Officer of Health was never informed that the work was being carried out at all. He was in complete ignorance of it until after the outbreak had taken place. The many duties of the borough engineer made it impossible for him to give detailed personal attention to the water supply. It will be seen that a fact which stands out in the case is that the supply was not analysed, chemically and biologically, sufficiently frequently. Whatever the cause, avoidable or unavoidable, of water pollution may be, it can be detected by analysis and action taken in time to prevent serious consequences. Pollution of water supplies rarely occurs, but as a safeguard against that one chance in a hundred, it is certainly worth consideration whether all water companies of any size should not be required not only to conduct daily chemical and biological analyses of their supplies, but to reject samples containing more than a certain standardised limit of undesirable constituents.

An International Pharmacopœia

THE question of the production of an international pharmacopœia is one of long-standing, but previous efforts have not produced a complete scheme of suitable drugs which at the same time was acceptable to the different countries concerned. According to *The Pharmaceutical Journal*, it has now been decided by the Health Committee of the League of Nations to establish a "Technical Commission of Pharmacopœial Experts" with the object of unifying pharmacopœias internationally. Dr. C. H. Hampshire will be the chairman of the commission on which Denmark, Belgium, France, Switzerland, Holland, America, and Russia will be represented. It is stated that the programme of studies drawn up by the commission will include the selection of suitable drugs for examination, and the determination of a uniform method of analysis, assay and preparation of the drugs selected. The results will be distributed among a number of national pharmacopœia commissions, and after co-operation with these bodies, a series of monographs on the different drugs will be prepared and finally circulated for international adoption and incorporation in an international pharmacopœia.

Testing Paint Durability

UNTIL accelerated weathering tests were introduced, the durability of a paint could only be assessed by actual exposure to normal atmospheric conditions. This was a long process and the information required by paint makers and users was not, therefore, easily accessible. Accelerated weathering tests are now carried out indoors in apparatus which cause the painted test panels to be subjected to the destructive influences of light and moisture continuously. Breakdown of the paint film is thus obtained by this intensive treatment far more rapidly than by outdoor exposure. Another advantage of the method is that the conditions of the test are under control so that for special purposes the resistance of the film to conditions of varying temperature, certain corrosives, etc., can be determined. Originally, it was intended to reproduce in the apparatus natural weather conditions as closely as possible, but it was soon realised that any attempt to do this would not only be futile, but unnecessary. With the artificial conditions of testing under control, a constant basis of comparison can be obtained.

Synthesis of Polyenes

Professor Richard Kuhn delivers the 6th Pedler Lecture

PROFESSOR DR. RICHARD KUHN delivered the 6th Pedler lecture before a large attendance of members of the Chemical Society at the London School of Hygiene and Tropical Medicine, recently, his subject being "Synthesis of Polyenes."

PROFESSOR F. G. DONNAN, president of the Chemical Society, who was in the chair, introduced the lecturer as "one of the ablest and most famous researchers and teachers in organic chemistry and bio-chemistry in the world."

Preparation of Conjugated Compounds

Professor Kuhn said it was with admiration that he had become acquainted with the career of the late Dr. Alexander Pedler, whose investigations ranged from organic chemistry through physics to astronomy. In direct contrast with that versatility stood the problem with which he (Professor Kuhn) had been engaged for more than ten years, namely, the artificial preparation of compounds containing the largest possible number of conjugated double bonds. He therefore proposed to speak of some of the results obtained so far in that scheme of research, synthetic methods which had proved most serviceable being given most prominence. He could refer only briefly to the connection between chemical constitution and physical properties; in that connection, there were, besides the regularities in melting points, the exhaustive measurements of the absorption and fluorescence spectra carried out by his so prematurely deceased colleague, K. W. Hausser.

Existing methods for the synthesis of the diphenyl polyenes were explained by the lecturer, who said they had endeavoured for some time to extend the series of diphenyl polyenes still further. It turned out, however, that the well-proved lead oxide method began to fail at about eight conjugated double bonds. They recognised that any considerable progress would only be made possible by the discovery of a fundamentally new synthetic method. Such a method was recently found by K. Wallenfels. The O-atom of the polyene aldehydes, just like that of the simple aldehydes, could be replaced by an S-atom by the action of hydrogen sulphide under suitable conditions. Similarly, the preparation of selenoaldehydes by the action of hydrogen selenide was also possible. H. Klinger had shown that sulphur might be split off from thiobenzaldehyde, and that the hypothetical bivalent radical benzylidene so formed converted to stilbene. That reaction could now also be carried out with thio- and seleno-polyene aldehydes. The removal of the sulphur was best brought about by metals such as copper, metal carbonates, various reducing agents, and also certain amines such as piperidine.

Synthesis of the Aliphatic Polyenes

They had not yet succeeded in preparing the pentadecaene in the pure state. The ability to sublime in a high vacuum fell off much lower down the series, and the solubility decreased so rapidly with the increasing number of conjugated double bonds, that they were unable to find a solvent from which to recrystallise the pentadecaene. The fundamental method for the synthesis of the purely aliphatic polyenes was the aldol-like condensation of acetaldehyde with itself. A convenient preparation of sorbinaldehyde was discovered with M. Hoffer, in 1930, in the action of piperidine on a mixture of acetaldehyde and crotonaldehyde. The condensation of crotonaldehyde with itself under the same conditions was, however, unsuccessful. As was later found with W. Badstübner, the crotonaldehyde condensed in the required sense only after exposure to sunlight, or after irradiation with a mercury lamp. That effect was apparently due to the formation of a small quantity of crotonic acid by autoxidation. If the irradiated "active" crotonaldehyde was shaken with alkali, it became "inactive" again. If some crotonic acid was added, the condensation proceeded at once even in the dark. They also found that the crotonic acid could be replaced by other acids. The sole necessary condition was that the amine used as catalyst should be present as a salt, and not as the free base. For preparative work "piperidine acetate," an equimolar mixture of piperidine and glacial acetic acid was employed. Since then they had used that catalyst very frequently for aldehyde condensations.

By the action of piperidine acetate on one kg. of crotonaldehyde, 100 g. of the orange-red dodecapentaenal (n = 5) could be obtained. The hexadeca-heptaenal (n = 7) formed deep red needles of melting point 218° C. K. Bernhauer showed that the yield of octatrienal from the condensation of crotonaldehyde varied widely with the kind of piperidine used. That was also true of the higher polyene aldehydes. In recent experiments with Ch. Grundmann, the catalyst and reaction conditions had been so much improved that forty per cent. of the cheap crotonaldehyde was converted into a deep red crystalline mixture of polyene aldehydes. All those aldehydes condensed with malonic acid in pyridine to give the carboxylic acid with one double bond more. In the case of the higher aldehydes, it was essential to use piperidine as catalyst (the Doebner reaction), while with the lower aldehydes, addition of piperidine considerably lowered the yields, since there the condensation of the aldehyde with itself became too rapid. On the other hand, the higher aldehydes condensed, but slowly with themselves in the presence of piperidine salts, so that the reaction with the methylene group of the malonic acid predominated.

Further Difference between the Polyene Aldehydes

A further difference between the "lower" and "higher" polyene aldehydes lay in the fact that the former with malonic acid and piperidine yielded the monocarboxylic acids directly, while the higher aldehydes in the presence of piperidine yielded only the dicarboxylic acids. Those must then be converted into the corresponding polyene carboxylic acids by decarboxylation. That was carried out by boiling with acetic acid and acetic anhydride rather than by dry thermal decomposition. The total direct synthesis of stearic acid was also of interest in connection with the biological synthesis of fatty acids in nature. That might be founded on a catalytic condensation of eight molecules of acetaldehyde in a straight chain. They were not as yet acquainted with the intermediate stages actually occurring in nature, but evidently not only acetaldehyde, but also its derivatives or predecessors like pyruvic acid (I. Smedley-McLean), might undergo the aldol condensation. During metabolism, reduction certainly occurred at an earlier stage than in the synthesis, since high unsaturated fatty acids, which could be detected by their colour, had not as yet been observed in either plants or animals. The catalytic hydrogenation of polyene aldehydes proceeded smoothly in all cases, yielding the corresponding saturated alcohols. In that way they obtained pure cetyl alcohol of melting point 48.5° C. from hexadeca-heptaenal (n = 7).

The oxalic ester method could also be applied to the synthesis of methylated polyene dicarboxylic acids. In that connection, it might be observed that not only methyl groups, but also methylene groups at the ends of a conjugated system, would condense with oxalic ester. Thus it was possible to obtain one and the same compound in two different ways, accordingly as the "right" or "left" carboxyl group was introduced as oxalic ester.

Polyenes, whose carbon skeletons might be considered as built up of isoprene residues, occurred in the pigments of the carotene group. The question naturally presented itself as to how far the synthetic methods already known could be applied to the synthesis of such substances. The answer to that was that they were as yet only at the beginning of that

field. The aldol condensation of terpene aldehydes with other aldehydes by means of piperidine acetate and similar amine salts had been successful in several cases. For example the condensation of citral with acetaldehyde carried out with Ch. Grundmann yielded citrylidene acetaldehyde in very good yield. They had already undertaken several unsuccessful experiments on the synthesis of the necessary β-ionylidene-acetaldehyde. Dr. C. J. O. R. Morris was successful in solving that problem. By application of the chromous chloride of J. v. Braun to the o-toluidide of the already known β-ionylidene acetic acid, he was able to reduce the carboxyl group to an aldehyde group. The β-ionylidene acetaldehyde so obtained was characterised by a beautifully crystalline semicarbazone of melting point 194° C.

By condensation of the aldehyde with methyl-butenal, and subsequent reduction by the Meerwein-Ponndorf method with aluminium isopropylate, C. J. O. R. Morris obtained an oil, evidently a mixture of different alcohols. Among those was one which gave the blue colour with antimony trichloride in chloroform characteristic of vitamin A. The position of the absorption band was as with the natural vitamin at 610mμ, and a mixture of the natural and synthetic compounds could not be differentiated by chromatographic analysis. The synthetic alcohol caused growth and healing of xeropthalmia with rats reared on a vitamin A-free diet. Since neither the natural or synthetic vitamins were pure, quantities which gave the same blue colour with antimony trichloride in chloroform were compared. In that way it was found that the growth effect of 0.8 γ of the synthetic alcohol corresponded with that of 0.9 γ of the natural vitamin A. Thus, not only the optical but also the biological properties showed very close agreement.

PROFESSOR R. ROBINSON, who moved a vote of thanks to Professor Kuhn, said that the professor was probably the most distinguished pupil of Richard Willstätter and, like his distinguished teacher, was universally admired and respected in this country as in every other country. He had over a period of years attacked the present subject in the most systematic way. He had given them a chapter of organic chemistry for which he and his collaborators were responsible, and had dealt with it from the organic chemical point of view. What they admired particularly was the new series of substances which had been prepared and the excellence of the methods developed in order to make them.

The vote of thanks was seconded by Professor J. C. Drummond and carried with acclamation.

The Aliphatic Diazo Compounds

Structure, Preparation by an Improved Von Pechmann Method, and Chemical Behaviour

PROFESSOR J. KENNER delivered the 42nd Bedson lecture at King's College, Newcastle-on-Tyne, on February 4, his subject being "The Aliphatic Diazo Compounds." He prefaced his remarks by considering the historical aspect of the subject.

The observation that the naturally occurring amide asparagine lost nitrogen when nitrous acid was present in nitric acid used for its hydrolysis led to the discovery of the general effect of this substance upon aliphatic amines. The work of Griess on aromatic diazo compounds was followed by the discovery of diazo acetic ester by Curtius, who turned to good account the suggestion of Baeyer that the acid part of glycine should be esterfied whilst investigation of the amino group was proceeding. Together with Buchner, Curtius described the properties of the new substance which are responsible for the importance of its congeners to-day.

With regard to the formula of the aliphatic diazo compounds Curtius favoured the cyclic structure, R.CH$<^{\|}_{N}$ but Thiele was led by observations of Staudinger and himself to propose R.CH = N$\equiv$N. Modern theory regards these compounds as examples of mesomerism, and the suggestion was now put forward that their formation from the diazo-hydroxides first produced, *e.g.*, in the preparation of diazomethane from nitrosomethylurethane, is due to the peculiar stability of the mesomeric state.

Professor Kenner's active interest in the subject arose from his investigations of the tendency of the nitroso-group to pass whenever possible into the oximino-group. This led to an improvement of the early von Pechmann preparation of diazo paraffins, consisting in brief in the alkaline decomposition of the N-nitroso derivative of the addition product of mesityl oxide and a primary aliphatic amine.

On the larger scale certain difficulties were encountered. Loss was occasioned by the liberated diazoparaffin combining with the mesityl oxide simultaneously formed, but was reduced by working at lower temperatures and by separating mesityl oxide from the distillate by a fractionating column. In the case of higher homologues whose boiling points approximate to that of mesityl oxide, pulegone can with advantage be substituted for the latter, in the preparation of the nitroso-compound. Ether, first used to carry away the diazo-compounds was recognised by Meerwein to inhibit their reactivity, but a very satisfactory technique was developed in which anisole is used as solvent and nitrogen as a carrier gas under reduced pressure.

Vinyldiazomethane and its methyl derivative exhibit a comparatively feeble reactivity towards acids; this was attributed to internal saturation, and in agreement with this the vinyl compound readily passes by monomolecular reaction into pyrazole.

After discussing some of the properties of the aliphatic diazo compounds their chemical behaviour was outlined, more particularly towards the ketones. The inertia of these towards diazomethane was first overcome when Meerwein activated acetone by means of methyl alcohol. The initial attack of the diazo-compound at the carbon atom of the carbonyl group is followed by loss of nitrogen and stabilisation, either by formation of an ethylene oxide ring or by a Wagner-Meerwein type of rearrangement. This latter, in the particular case of cyclic ketones, results in ring enlargement; cyclo-hexanone, for example, gives on treatment with diazomethane, 46 per cent. cyclo-heptanone. Similar reactions have been carried out with the homologues of diazomethane (which are more reactive than the parent substance), and numerous 6–, 7–, and 8– membered 2– alkyl cyclo-ketones have thus been prepared. The same products were prepared directly from the corresponding nitrosourethanes by a procedure applied by Meerwein to nitrosomethylurethane, and this has the advantage of applicability in cases in which it may not be possible to prepare the diazo compound itself. By this device also it is possible to introduce groups into a ketone which may be of use in further synthetic operations.

FOR the purpose of cultivating rubber plants in Italy, a company has been jointly promoted by the Pirelli concern and the Institute for Industrial Development (I.R.I.) under the style of S.A. Industriale Gomma. It is intended to cultivate the guayule plant and to establish or finance other companies exploiting the plant. In due course the company will also organise the trade in rubber.

The Production of Oil from Coal

Extracts from the Report of the Falmouth Committee*

Professor A. C. G. Egerton, F.R.S., a member of the Committee.

THE Committee were appointed by the Minister for the Co-ordination of Defence on April 26 last—"To consider and examine the various processes for the production of oil from coal and certain other materials indigenous to this country, and to report on their economic possibilities, and on the advantages to be obtained by way of security of oil supplies in emergency."

There are six or seven possible methods of producing oil products in this country and for convenience these are classified in three categories:—

A.—Natural petroleum and shale oil.

B.—The coal carbonisation industries:—

(i) gas industry,

(ii) coke oven industry,

(iii) low temperature carbonisation.

C.—Hydrogenation; Fischer and similar synthetic processes.

The Committee have placed the shale oil industry in category A because it is practicable to produce from crude Scottish shale oil a full range of products similar to those obtained from natural petroleum. It was, in fact, the early work carried out on shale oil in this country which greatly assisted the early commercial development of the petroleum industry.

Natural Petroleum

It has been for some years the policy of H.M. Government to encourage the search for natural petroleum in this country, but so far the quantities discovered have been negligible. The Committee have taken note of the renewed activity which is being displayed in this direction, and, while it is possible that increased supplies may be found, they do not consider the position is as yet sufficiently clear to warrant them taking such a possibility into account.

The case of the shale oil industry is an interesting one. It has existed for a long period of years and at times has enjoyed considerable prosperity. But in spite of the improvements in organisation, concentration on the most efficient units, and the large measure of assistance at present afforded by the preference, amounting to more than the whole of the wages cost, it finds the competition of natural oil products difficult to withstand. Those responsible for the industry have stated that, if the preference is maintained, it will probably in time again be able to increase considerably its production.

Possible Extension of Shale Oil Industry

The Committee consider that the industry is worthy of every encouragement. Its raw material cannot be put to any other use and there is no competition between its products and those of other existing home industries. There are other considerable resources of shale in various parts of the country, but the possibility of the extension of the industry to utilise these is dependent upon the development of a process for the economical removal of sulphur, which is often associated with these shales.

The other possible sources of home-produced oil are those which arise from the treatment of coal, which is the most important raw material indigenous to this country. Both the gas and coke oven industries carbonise the coal they use at high temperatures; both obtain gas, coke and tar as products. In the case of the gas industry, the coke and tar therefore are by-products, and in the case of the coke oven industry, the gas and tar fall into that category. It follows that the capacity of the gas and the coke oven industries to provide supplies of oil products is governed by the demand for their principal products.

The methods of low temperature carbonisation used fall roughly into two main divisions: (a) Those which carbonise coal alone; (b) those which carbonise a mixture of coal and oil. The majority of plants in operation belong to Class (a). With regard to Class (b) the yield of oil per ton of mixture processed is, as might be expected, greater than if coal alone were used. When, however, the quantity of oil used in the mixture is taken into account, the recovery of tar oil from the coal alone shows very little, if any, improvement. In the view of the Committee, there is little advantage to be derived from the use of this method as opposed to the carbonisation of coal alone.

The oil produced is a by-product; and while there is some variation in the yield of liquid products obtained from different processes, the evidence received has led the Committee to the conclusion that the extent of the variations does not represent more than a few gallons per ton. Accordingly, there is no single process which the Committee could advise should have special consideration on account of the quantity of oil products obtained. The yield of tar in most of the low temperature carbonisation methods which have been tried out on a semi-commercial or commercial scale is about three-quarters as much again per ton of coal carbonised as that produced at gasworks and coke ovens; and it is agreed that it is rather more amenable for the production of oil fuels than high temperature tar.

Development of Low Temperature Carbonisation

The question then arises: What are the prospects of a really large-scale development of low temperature carbonisation?—and to this point the Committee have given careful consideration. The low temperature carbonisation method is first and foremost a coke-producing process, and that in consequence its commercial value is dependent on the possibility of disposing of the coke. The coke at present produced finds a ready sale, in spite of the fact that the price obtainable per ton is much in excess of that of gas coke, and higher than that of best house coal; while this is an encouraging feature, the evidence laid before the Committee led them to the conclusion that there is at present no assurance that there will be a really large market for such a highly priced fuel. The position might be altered, however, were legislation to be passed within a reasonable period which compelled the use of smokeless fuels for domestic fires, although a measure of this kind might also stimulate the consumption of alternative fuels, and there are indications that low temperature coke is likely to meet in future with increasing competition. Developments are already taking place in regard to the use of high temperature coke in open grates, and steps are also being taken to promote the further use of smokeless coals, and for developing grates which will be able to use bituminous coals with little emission of smoke. If these several attempts are successful, then the Committee think that, while low temperature coke may take its place with these other fuels, any idea that it can capture the whole or even a large part of the domestic market is open to question.

The Committee further examined the claim made by many

*The full report is published by H.M. Stationery Office, 1s. 3d.

advocates of low temperature coke that a big development of this process would bring about a much wished for revival in the coal industry. The Committee have to report, however, in this connection, that the conclusions they arrived at were disappointing. In so far as low temperature coke might be used as a substitute for raw coal, very little increased demand for coal would ensue, as it is calculated that only 10 per cent. more coal would be required to give an equivalent amount of fuel and heat value. Representatives of the coal industry itself were very doubtful if any advantage would be gained by that industry if a large increase in the manufacture of coke by low temperature carbonisation were to take place.

The Committee made a calculation of the results that would ensue if it were possible to secure a large-scale development, and as a result, in their view, low temperature carbonisation must, in the light of existing information, be ignored as a possible major source of indigenous oil supply.

Hydrogenation

The hydrogenation process differs fundamentally from the above processes in that the sole object of this method when treating coal is the production of oil. No important products are obtained which compete with coal, or with its by-products such as gas and coke, and the successful economic development of the process on a large scale would open up an entirely new field for the use of coal.

The work at Billingham carried out by Imperial Chemical Industries, Ltd., has covered each stage of development. First, considerable investigation was undertaken in the laboratory. Then extensive work followed in a semi-commercial scale unit, and, finally, for the past two and a half years, there has been the experience of a large commercial scale plant.

The Committee were informed by the company that the most suitable coals for hydrogenation are boiler slacks, not only because they are cheap, but because the friable coal included the most easily hydrogenable coal. It had been found that all coals of which the carbon content, on an ash and moisture-free basis, was less than 87 per cent., were amenable to hydrogenation. A special large-scale test had been carried out on South Wales coals, at the request of the Mines Department, and the Committee were informed that favourable results had been obtained in respect of some of the coals submitted and Imperial Chemical Industries, Ltd., were satisfied that sufficient supplies were available to meet the requirements of a plant in that area. Anthracite and steam coals were not suitable.

If a new hydrogenation plant were to be built, it would have to be designed to use coal only, as there are not available supplies of creosote or low temperature tar in sufficient quantities to provide for another mixed coal and tar plant. The plant would have a capacity of 150,000 tons of petrol as Imperial Chemical Industries, Ltd., regard this size as the minimum from an economic point of view. The capital cost of such a plant (to include land, offices, site development and design charges, research charges essential for this new plant, working capital, interest during construction, and fees payable to the International Hydrogenation Patents, Ltd.) is estimated by Imperial Chemical Industries, Ltd., at £8 million.

Further Development of the Process

As regards further development of hydrogenation, under present conditions the company would not be prepared to enter into any extensions of their commitments in regard to further hydrogenation development, nor did they anticipate that any other commercial organisation would be prepared to do so. The company stated that even if the guarantee of protection were unlimited, they would not extend their hydrogenation commitments for at least another two years, when they would have derived full benefit from the Billingham experience. If the Government desired that the further development of hydrogenation by commercial interests should be undertaken, it was the company's view that the scope of the Government assistance necessary would have to cover: (a) An additional guarantee period under the above Act for a sufficient length of time and at a rate to make any additional proposition commercially economic; (b) a reasonable rate of return on such capital as is provided by commercial interests; (c) the provision of sufficient allowance for depreciation and obsolescence during the guarantee period.

With regard to the above three conditions, the company felt that these questions were so inter-related that it was difficult to estimate with any accuracy the period for which the assistance would be necessary, but if the preference remained at 8d. per gallon, the period should be at least 10 years.

Synthetic Processes

There are two of these processes, one of which is being developed at present in Germany, *viz.*, the Fischer-Tropsch process (generally called the Fischer process), and the other, the process of Synthetic Oils, Ltd., is being investigated in this country in a semi-commercial unit.

The Fischer process consists in the conversion of so-called "synthesis gas"—a mixture of 1 volume of carbon monoxide and 2 volumes of hydrogen—into an oil product. The starting material may be either coal or coke. Work on synthesis of hydrocarbons from mixtures of carbon monoxide and hydrogen has been carried out at the Fuel Research Station during the past three years. As only small-scale laboratory experiments have so far been carried out in Great Britain, it follows that there is no practical experience available of the working of the process in this country.

Certain important industrial concerns in this country have given close consideration to the possibility of establishing a plant here. At one stage these concerns were brought together by H.M. Government and invited to consider whether they could submit, either individually or acting together, a reasonable business proposition to the Government which envisaged the establishment of a plant. These interests represented important groups concerned with the coal industry, the oil industry and the plant construction industry. If such a combination had been prepared to undertake the erection of a Fischer plant, it would have constituted an important step in the investigation of this process on a commercial scale in this country. It is understood that the attempt failed.

Views of the Fischer Process

Some of the witnesses who were prepared to suggest that the Fischer process should be developed on a commercial scale in this country, were obviously influenced in their views largely because of the scale of development which is taking place in Germany. Some went so far as to say that the Fischer process was being developed to the exclusion of the Bergius hydrogenation process. The general views expressed to the Committee go to show that both processes are being developed as part of the policy of the German Government to make Germany self-supporting in regard to supplies of motor fuels. It is also important to bear in mind that in Germany a substantial proportion of the raw material used in these oil from coal processes is brown coal, of which very large supplies are readily obtainable, at a much cheaper rate than bituminous coal. In this country no commercial supplies of indigenous brown coal are available. Information on the yields of products was very difficult to establish. Although samples of the primary products have been obtained for examination in this country, there would appear at present to be no substantial measure of agreement as to what is the best method of treatment, or as to what products would give the most economic return in this country.

It is clear from the evidence obtained that a considerable measure of assistance in some form from the Government would be required before any commercial undertaking would contemplate the erection of a plant. As regards the question of the guaranteed preference, the period suggested was usually about 12 years, although a period of 20 years was

also mentioned. While the Committee have not been able to obtain data which they could accept as reliable in regard to the points which have been set forth above, there are certain features about the Fischer process which they consider merit closer investigation in this country. But the Committee were impressed by the views submitted to them by several important witnesses that the determination of the value of the process to this country can only be secured if a plant on a commercial scale is available.

The Committee do not feel that at this stage they can express any opinion on the process of Synthetic Oils, Ltd.

Economic Aspects of Home Oil Production

The wide publicity which has been given to the fact that it is technically possible to produce oil from coal has, not unnaturally, raised great hopes. But the step from technical achievement to economic success may be a long one, and this is not sufficiently appreciated. It is clear that in normal times this country has no difficulty in obtaining the oil supplies it requires from overseas. It is abundantly evident that, so long as the price of imported fuel remains in the neighbourhood of the present figure, the case for home-produced oil, judged by purely economic standards, falls to the ground. Hence it follows that if it is desirable for any of the reasons, provision of employment, technical and industrial development, and defence, to produce oil from coal or other indigenous materials, Government assistance in one form or another must be forthcoming.

The Position in Time of War

The proposal has frequently been put forward that arrangements should be made for the production of large quantities of hydrocarbon oils from home resources as a means of supplying, or at any rate materially supplementing the supply of, these very important oils in time of war. It has been shown that it is possible to produce oil from indigenous resources by different methods; but the only methods which can be looked upon as potential sources of large supplies of oil are the hydrogenation and the Fischer or similar processes. On account of the low octane number of its motor spirit, and the lack of knowledge concerning the possible yields of high-grade oils, the Fischer process must still be considered, in spite of the development it has undergone in Germany, to be of uncertain value so far as the needs of this country are concerned. For the time being, therefore, it is to the hydrogenation of coal that the country would have to look if it were desired substantially to increase the output of oil from home resources; under present conditions the use of this process for the production of light oils is the only possibility which need be seriously considered.

The Committee have come to the conclusion, as the result of their examination of the various important factors, that in general a policy of depending on imported supplies with adequate storage, is the most reliable and economical means of providing for an emergency; and they cannot recommend the reliance of the country in war time on supplies of oil from indigenous sources especially established for this purpose, unless any particular aspect of the case can be shown to be exceptional.

Recommendations

It is quite evident to the Committee that if there is to be further development of the production of oil from coal on any important scale, or, indeed, if the production of even the existing amount of oil products from home resources is to be maintained, a continuance of a guaranteed preference on home-produced spirit is essential. In existing circumstances the Committee have expressed the view that the amount of the preference necessary is not less than 8d. a gallon, which is the present rate of preference now given, but double the amount of the guaranteed preference.

The Committee, therefore, strongly recommend the continuance of a guaranteed preference for a period of 12 years from 1938, the rate being increased from 4d. to 8d. per gallon, and the guarantee extended to include diesel oil for use in motor vehicles.

The Committee recommend that assistance to the low temperature carbonisation industry should be limited to participation in the benefits to be derived from the guaranteed preference on home-produced oils. It will thus be afforded the same assistance as the other carbonisation industries. The Committee consider that the grant of direct financial assistance for the establishment of further plants cannot be justified. The Committee consider that the facilities provided by the Department of Scientific and Industrial Research for carrying out, free of charge, an official test of low temperature carbonisation plants should be continued; but that the tests and the reports thereon should cover all technical points connected with the operation of, and the products of the process, and not merely with the carbonisation aspect.

The Committee consider that it would be of considerable advantage if the establishment of a plant to work the Fischer process, and designed for the production of not less than 20-30,000 tons of primary products per annum could be secured. They hope that, with the extension of the guaranteed preference, one or more industrial concerns may be induced to undertake the erection of such a plant. But if financial assistance is requested from the Government, the Committee recommend that such assistance should be limited to sums required for special items of research work which, by agreement with the Department of Scientific and Industrial Research, can be recommended as being of national interest.

The Scottish shale oil industry is a small, though important, industry. The recommendation of the Committee for a continuance of the guaranteed preference under the first recommendation above should be of great assistance in encouraging its development.

Oil Tankers in River Thames

New Regulations May Affect Oil Storage Business

THE Port of London Authority is proposing to amend its bye-laws relating to petroleum spirit and is submitting them to the Minister of Transport for his approval. The principal alteration relates to the limit beyond which vessels laden with petroleum spirit in bulk cannot proceed up the river. The existing limit is in the vicinity of Thames Haven and it is now proposed that vessels should be permitted to proceed to Purfleet.

This development is of special interest. In 1928 a proposal put forward by the Authority to allow low-test petroleum ships to come higher up the river than Thames Haven was rejected. The possibility exists that this change may react unfavourably on London and Thames Haven Oil Wharves, Ltd., which at present has a virtual monopoly of oil storage business in the Thames, through its organisation at Thames Haven.

Action against Gas Manager

Statement about a Low Temperature Carbonisation Process

PRIVILEGE enjoyed by a public official was the principal ground upon which Mr. John W. M'Lusky, gas manager of Glasgow Corporation, challenged the relevancy of a £10,000 suit brought against him for slander, at Paisley Sheriff Court.

Mr. Robert Maclaurin, Stirling, technical chemist, and the inventor of a low temperature carbonisation process, is pursuer in the action which was the subject of a three hours' debate before Sheriff Hamilton announced that he made avizandum. Mr. Maclaurin alleges the publication of "false, malicious and calumnious statements" regarding his process. The defendant replied that he at no time used his influence unjustly to prevent the use of the invention which, had it been commercially sound, he would have had no hesitation in recommending to the Corporation, for the purposes of producing fuel for domestic purposes.

Alleged Disclosure of Secrets

Judgment in Action Brought by British Industrial Plastics, Ltd.

IN the King's Bench Division on Monday, Mr. Justice Porter delivered his reserved judgment in the action (see *The Chemical Age*, 1938, *38*, 84) in which damages were claimed for alleged conspiracy by British Industrial Plastics, Ltd. (formerly British Cyanides Co., Ltd. who manufacture synthetic resins and moulding powders, of Ideal House, Argyle Street, London, from their former works' manager, Mr. Stephen Walter Doherty, of Pine Walk, Carshalton, and James Ferguson and Sons, Ltd., of Merton Abbey, and Mr. J. E. Ferguson, of Marloes Road, London, W., and Mr. F. A. Ferguson, managing director of Messrs. Ferguson.

Messrs. Ferguson manufacture goods similar to the plaintiffs.

Plaintiffs also sought an injunction against the defendants to restrain them from disclosing or making use of plaintiffs' secret processes with the manufacture of amino plastic powders.

They further claimed against Mr. Doherty for breach of contract and Fergusons were sued for inducing the alleged breach.

The defence was that there was no reason to patent the process as it was common knowledge, and that the whole of the subject matter was common knowledge.

Plaintiffs case was that Mr. Doherty was employed by them for some years, and ultimately as works' manager. Later he was paid a retainer not to engage in similar work with any other firm. Plaintiffs alleged that in the expiring of the agreement in 1934 Doherty entered the employment of Fergusons. He had also applied for a patent and assigned his rights to Fergusons of a process for manufacture of moulding powder. Plaintiffs said that was a secret process to which they had spent some £30,000 in research work since 1934. Plaintiffs had not patented the process for certain reasons. Doherty, they said, had undertaken not to disclose their secrets when he was appointed manager in 1916. Plaintiffs asserted that they had taught the world in the manufacture of amino plastic moulding powders.

His lordship, in giving judgment, held that even if Mr. Doherty was not bound by secrecy agreement, he had entered into with the plaintiffs, he was under an obligation not to disclose the firm's secrets in entering the employ of Fergusons. He found that he had disclosed their secrets and he awarded plaintiffs £15,000 damages. In his view the process was the plaintiffs' secret. He thought that Mr. Ferguson and his co-directors were negligent and muddle-headed in their dealings with Doherty, but he did not find that their minds were fraudulent.

With regard to the action against Fergusons he found that conspiracy and inducement were not proved, and gave judgment for Mr. Ferguson and Messrs. Ferguson with costs. He could not grant an injunction, but he would hear arguments later if the parties so desired.

Imports of Chemicals in Eire

Statistics for 1937

IMPORTS of chemical manufactures and products in Eire during 1937 were valued at £522,082, an increase of over £30,000 compared with 1936. Values of individual groups are as follows:—Acids, £25,840 (£23,442; calcium carbide, £10,878 (£9,257); chemical food preservatives and flour improvers, £10,766 (£47,201); copper sulphate, £66,481 (£43,078); disinfectants, £32,595 (£45,000); potassium compounds, £12,131 (£11,194); caustic soda, £13,616 (£15,014); other sodium compounds, £101,760 (£94,891); cream of tartar, £11,328 (£9,939); other chemical manufactures and products, £236,687 (£191,903). Imports of medicines and medicinal preparations amounted in 1937 to £317,726, compared with £296,135 in 1936.

Plating Works Fatality

Electro-Plater Dies from Effect of Cyanide Poisoning

AN open verdict was returned by the jury at a Liverpool inquest on February 8 on Bridget Cecilia O'Hare, aged 23, of Lambourne Road, Walton, Liverpool, who died from poisoning a few hours after collapsing at her work. It was stated that Miss O'Hare was employed as an electro-plater at the works of the Automatic Telephone Co., Milton Road, Liverpool. She was taken ill at her work on January 21, was removed unconscious to hospital, and died shortly afterwards. The girl's duties were to remove articles from a storage tank containing sodium cyanide, swill them and then hang them in the plating tank, containing zinc cyanide, caustic soda, and sodium cyanide. The articles were again swilled in running water and transferred to another vat.

Professor W. H. Roberts, Liverpool city analyst, said he made an examination of certain organs and found traces of hydrocyanic acid in the stomach. He was satisfied that this was the cause of death, and he thought that ingress into the body had been through the mouth. He had visited the room at the works where the girl was employed and did not think the employees could have better working conditions.

Mr. J. W. T. Holland (representing the firm) asked if the girls leaned over with their mouths open, and there was a splash, was it likely that it could be got in that way?—I do not think it is very likely.

Witness added that he was quite satisfied with the precautions taken by the firm in regard to this particular process; they could not have been better.

Charles Velade, foreman of the plating department, said the process had been carried on for nearly thirty years, and the firm had no record of any casualties suggesting contamination by cyanide. Every worker was informed by the welfare department of the poisonous nature of the solutions, and was provided with rubber gloves and rubber aprons. The girls were instructed to report to their charge-hand if they came in contact with any of the solutions, and they were taken at once to the emergency room.

Miss Clara Woods, a spot tester in the same department, said she never felt any ill-effects from her work. On January 20 Miss O'Hare brought a test to her and witness noticed that her eyes were watering. In reply to witness, she said: "I have had a splash in my mouth from the zinc." On instructions she washed her mouth out.

Professor Roberts, recalled by Mr. Holland, said he did not think the "splash" referred to as having occurred the day before the girl's death had anything to do with it. If the girl had had a fatal dose then, she would have died the same day. He thought the poison must have entered the body after 1.30 p.m. on the day she was taken ill. He had not formed any opinion from the evidence as to how it entered the body.

Addressing the jury, the Coroner (Mr. G. C. Mort) said the only conclusion they could reach was that death was due to cyanide poisoning, and it seemed clear that it must have been ingested during the lunch hour on January 21. The evidence did not indicate which way the cyanide was taken into the stomach.

Standard Specification for Ostwald-Folin Pipettes

THE British Standards Institution has just issued a British Standard specification for Ostwald-Folin pipettes (B.S.S., No. 772, 1938). This specification covers Ostwald-Folin pipettes calibrated for delivery and those calibrated for content. The clauses of the specification cover the range of sizes, capacity, material from which the pipette should be made, dimensions, the shape of the bulb and the jet, graduation marks, delivery time and permissible tolerances. Copies of this specification can be obtained from the British Standards Institution, 28 Victoria Street, S.W.1. Price 2s., or 2s. 2d. post free.

The British Industries Fair, 1938

A Survey of the Exhibits to be shown in the Chemical Section

THE British Industries Fair opens on Monday next at Olympia and Earls Court, London, and at Castle Bromwich, Birmingham, and continues until March 4. It will be even larger than last year's fair, which was in itself a record. The total exhibiting space allotted to date is 855,850 sq. ft. as compared with 839,011 sq. ft. last year. Exhibitors at London and Birmingham number 2,410 at the moment as against 2,560 in 1937.

The Chemical Section, which is bigger in size than last year, is again under the auspices of the Association of British Chemical Manufacturers, and has pride of place, with the Scientific Instruments' Section, immediately inside the Addison Road entrance to the Fair.

The Association has an office on Stand No. A611 in the Section, where literature will be distributed and inquiries answered as to sources of supply. Literature includes the Association's main Directory, covering all the products of its members, in six languages, namely, English, French, German, Italian, Spanish, and Portuguese, and the Directory of British Fine Chemicals, which will indicate the manufacture of over 3,000 fine chemicals in general use. A new feature of the main Directory is the inclusion of a section on proprietary and trade marks, with examples. Information regarding the services rendered to the chemical industry by the Association of British Chemical Manufacturers will also be available, with samples of the Association's regular publications, such as its monthly summary of chemical trade, its safety circulars and its quarterly safety summary, and there will also be available the latest edition of the Directory of the British Chemical Plant Manufacturers.

New Products

Attention may be drawn to a number of products which are either new, or are being offered in new form. Sodium alginate as a reactive colloid in a highly purified form possesses extremely useful properties for controlling viscosity. Terpeneless oils of very high quality are a welcome introduction. The attention devoted during the year to the so-called "plant hormones" is reflected in a display of substances such as beta-indolyl acetic acid. The advent of a new plastic material from an unusual source is heralded. The practical importance of reagents for spot tests and micro analysis is encouraged by the offer of a special trial order of samples of 30 such materials. New oxidation-reduction indicators are announced. In the range of fine chemicals also the display of ortho-anisidine, ortho-phenetidin, and paraphenetidin; some new camphor-sulphonates, nicotinic acid and iodo-organic acid derivatives are of interest, while a range of dyes for the anodic colouring of aluminium is now available.

In 1937 the improvement in trade was mainly due to home consumption, and the British chemical industry has shared in this general improvement. The total imports of raw materials have naturally increased on account of present activities in this country, and the processing of these and their manufacture into finished articles has meant an increased consumption of chemicals. At the same time the chemical industry has succeeded in increasing its export business in spite of attempts by other countries to achieve economic nationalism, and in the face of unsettled world conditions.

The Board of Trade official figures for chemicals, drugs, dyes and colours (Class III, Group N), as given in the Trade and Navigation Reports show total exports in 1937 of £24,660,151 as compared with £21,091,994 in 1936 and £21,328,503 in 1935, an increase of £3,568,157 or 14.5 per cent. over 1936. The imports under the same heading amounted to £13,837,325 in 1937, as compared with £12,579,464 in 1936 and £11,601,484 in 1935, an increase of 10 per cent. over 1936. The increase of three and a half million in exports as compared with only one and a quarter million in imports is very encouraging. Home products are also increasingly replacing imported chemicals, and this is shown by the entire absence of imports during the year of many products previously imported in fair quantities. British consumers, as well as users abroad, are evidently realising that there are no magic properties in foreign chemicals, and that the British product can compete effectively as regards price as well as regards quality. The main increases in exports have been in respect of bleaching powder, sodium carbonate, caustic soda, ammonium sulphate, fertilisers, dyestuffs, cresylic acid, tar, creosote oils, and copper sulphate. The increases in the value of both imports and exports are partly due, of course, to higher prices caused by the present trade conditions.

In the field of overseas trade the criticism made last year of dumping by Dominion producers has been met partially in the case of Canada by a provision in the new Trade Agreement, which at least admits the existence of the problem. The initiation of trade conversations with the United States marks an important step forward in world affairs, while discussions with Australia, and perhaps New Zealand, are also expected to take place in 1938. The negotiations for the revision of the Ottawa trade agreement with India have proved difficult and protracted, but are still continuing. Chemical exports to Poland have increased slightly in spite of difficulties due to the operation of the quota and licensing system.

Amongst the news items of the year, reference may be made to the great stimulus given to the consumption of lime and basic slag by the Government's subsidy scheme, the discussion on long term policy in regard to oil from coal, the Government's inquiry into the production of calcium carbide in this country and the decision by a British company to manufacture. Mention is made in the descriptions of individual exhibits which follow of various chemical developments of interest. We intend to publish further notes on the exhibits at Olympia and a description of exhibits of interest at the Birmingham Fair in next week's issue.

Exhibits on View at Olympia

Albright and Wilson, Ltd.

(STAND NO. A665.)

The range of products made from phosphorus and its derivatives is capable of considerable extension. It is the policy of this company to find out industrial applications which will absorb some of these valuable, but as yet little known products. The alkyl phosphates tributyl, triethyl and tri-methyl phosphate fall into this category and are beginning to find a market as important solvents in the plastics industry. Phosphorus in its various forms and the compounds thereof, oxychloride, trichloride, pentachloride and pentasulphide, are displayed. The pure and technical grades of phosphoric acid and the numerous salts which have applications in every class of industry are also shown.

Calgon, a form of sodium hexametaphosphate, continues to find an ever increasing number of applications. Keith Piercy, Ltd., are in charge of distribution, and some interesting exhibits are on the stand.

Di- and tri-sodium phosphate are shown in two forms—hydrated and anhydrous. These alkaline salts are finding a growing market as the base for both industrial and domestic detergents. The anhydrous salts containing 48/50 per cent. and 40 per cent. P_2O_5 respectively are of particular interest to export markets owing to the saving in freight. A salt of importance to the textile industry for bleaching processes is neutral sodium pyrophosphate; it is shown in the anhydrous and crystalline form. A product with interesting bleaching properties is sodium phosphite.

Carbon tetrachloride, sodium chlorate and tartaric acid are products of the company on view.

There are several new products which should be noted on the stand, namely, strontium salts, calcium gluconate and sodium alginate. Production of the first-mentioned was begun early in 1937. Calcium gluconate, which has a growing demand in certain medical preparations, is also a recent introduction. It is standardised to the requirements of the British Pharmacopœia.

Sodium alginate in a highly purified form is an entirely new product. It is sold under the trade name of Manucol. Among its applications, it is an excellent base for cosmetics in place of the more expensive vegetable gums, and takes the place of agar-agar and gelatine as gelling agents or stabilisers in foodstuffs.

A. Boake, Roberts and Co., Ltd.

(STAND NO. A634.)

There is shown a wide and varied range of fine chemicals, essential oils, and intermediates including several of the utmost importance of which this firm are the sole manufacturers in this country.

A wide variety of solvents and plasticisers used chiefly in the manufacture of cellulose ester and cellulose ether lacquers, plastics, moulded products, printing inks, and paints and varnishes are shown. In particular should be mentioned ethyl, butyl and amyl acetate as solvents, tricresyl phosphate, dibutyl phthalate, and ethyl and butyl acetyl ricinoleate, as plasticisers, Abrac ester gums, and Abralac synthetic resins of the polyhydric alcohol-polybasic acid type.

A wide range of metallic soaps of guaranteed metal content is displayed, and soaps are shown derived from triethanolamine, ammonia and the alkali metals as emulsifying agents.

Pharmaceuticals, flavouring essences, food colours, food preservatives, chemicals for foodstuffs, and oleo resins are exhibited and prominence is this year given to the display of essences and extracts for flavouring purposes, particularly to "Drydex" and "Olio" flavours. In terpeneless oils A. Boake, Roberts and Co., Ltd., are now offering a number which have been prepared by a new process.

There is also shown a range of perfume bases, cosmetic materials and deodorants. Various grades and strengths of phosphoric acid and phosphates for all purposes, sulphur dioxide and derivatives of sulphurous acid, saponines and tannic acid, fire extinguishing products, sulphonated oils, disinfectants and detergents, and acetic acid and carbon black are also on show.

Boots Pure Drug Co., Ltd.

(STAND NO. A686.)

Boots Pure Drug Co., Ltd., is displaying a wide range of chemical, medical, pharmaceutical, veterinary and horticultural preparations and a section of their exhibit is devoted to a demonstration of some of the methods of control as used in their Nottingham laboratories. Among the chemicals shown are a range of bismuth salts, magnesium carbonate, glycerophosphates, iodine, potassium iodide and aspirin. Mandelic acid and its sodium salt have received considerable attention since the discovery of their use in the treatment of urinary infections. Potassium permanganate is now manufactured on a large scale at Boots' Beeston factory.

Proprietary preparations include products for use under medical direction, frequently referred to as Boots Special Medical Products, and a wide range of pharmaceutical compounds for the treatment of minor ailments and for general use in the home. New pharmaceutical products displayed are Rheumelim (compound effervescent piperazine granules) which has given excellent results in the treatment of rheumatism and allied conditions, and Matrilac, a preparation of milk sugar with added minerals for preparing humanised milk.

An interesting branch of Boots' business is the manufacture of horticultural washes, including insecticides and fungicides. Examples of these are Sulsol (a colloidal sulphur preparation), Bouisol (colloidal copper compound), and Flosol (colloidal barium silicofluoride). Boots' veterinary service has developed considerably during the last few years and many veterinary preparations are exhibited.

The British Drug Houses, Ltd.

(STAND NO. A674.)

The exhibit comprises examples of pure chemicals and preparations for medicinal use, in addition to laboratory chemicals and apparatus for general scientific purposes. The isolation and manufacture of pure vitamins is one of the special activities of The British Drug Houses Ltd., and specimens of the products are shown. Among the hormone products exhibited is Protamine Insulin (with zinc) Suspension, the newly introduced insulin product, as well as insulin, thyroxine, di-iodo-tyrosine, acetylcholine and pituitary extract.

A series of medicinal chemicals and chemo-therapeutic agents is displayed, and exhibited for the first time are B.D.H. vaccines for human and veterinary use. These are prepared in the B.D.H. laboratories from suitable carefully selected virulent cultures, whilst, when it is necessary, freshly isolated strains are employed. For the first time also the B.D.H. are exhibiting a range of ethical products specially prepared for use in veterinary practice.

Exhibited are examples from 5,000 organic and inorganic laboratory chemicals including specimens of the 220 "AnalaR" chemicals conforming to specifications for purity published in the book of "AnalaR" standards for laboratory chemicals. This year an entirely new note is struck by the inclusion of β-indolyl acetic acid and other substances which have been shown to stimulate and control the growth and division of cells and formation of roots in plants. The section devoted to indicators is completed by adsorption indicators and oxidation-reduction indicators, and in this section are shown standard tablets of methylene blue for milk testing.

W. J. Bush and Co., Ltd.

(STAND NO. A675.)

W. J. Bush and Co., Ltd. are showing all the essential oils that can be distilled in this country, including peppermint and lavender, together with those produced in the Colonies. A complete range of the fine chemicals for use in the soap industry, perfumery and pharmacy, etc., are shown. This range includes cinnamic aldehyde, of which they are the only British manufacturers, ionone alpha and beta, benzyl acetate, benzyl benzoate, benzyl alcohol, benzaldehyde P.F.C. benzoic acid, sodium benzoate, citronellol and esters, geraniol and esters, linalol and its esters (amyl cinnamic aldehyde, phenyl acetaldehyde). This firm is also showing a new series of ionones which give new notes and are valuable perfumery adjuncts, and such specialities as vanillin-Bush, coumarin-Bush, heliotropine-Bush, cream of tartar and aspirin (Fre-Flo Brand).

The Distillers Co., Ltd.
British Industrial Solvents, Ltd.
The Methylating Co., Ltd.

(STAND NO. A610.)

The wall space of the joint stand of these three companies will be occupied by an illuminated "tree" showing how a wide range of chemicals of industrial importance are derived from ethyl alcohol.

The Distillers Co.'s activities include the manufacture of various grades of pure alcohol, malt extract, yeast, and yeast derivatives such as nucleic acid and invertase. This year "The Distillers" are exhibiting a new material bearing the registered name "Distrene." This is a thermoplastic material of special interest to those engaged in the electrical industry on account of its extraordinary insulation properties. It will be shown in the form of glass-clear blocks and rods, films and filaments, and in ways which demonstrate its unusual properties, thus indicating its possible applications.

The four chief grades of methylated spirit will be illustrated by their main uses by The Methylating Co. British Industrial Solvents, Ltd., with works at Hull and Carshalton, manufacture acetic acid, acetone, butyl alcohol and a large number of esters, aldehyde and related products.

The Gas Light and Coke Co.

(STAND NO. A667.)

This company's exhibit consists of about 40 specimens of their range of tar, ammonia and cyanogen products. Chief amongst these are creosote for wood preservation and hydrogenation purposes, pitch for briquetting and various manufacturing purposes, and tars. Tar spirits shown include benzoles, toluoles, solvent naphthas, xyloles and heavy naphtha. Crystal phenol for use in the synthetic resin industry, and cresylic acids are of particular interest.

Naphthalenes range from drained, whizzed and pressed crudes, to purified crystal, powder, ball and flake forms. Pyridines cover 90/180, 90/160 and 90/140 grades, and pure qualities of narrow boiling ranges. Ammonia products include sulphate of ammonia and liquid ammonia. There is a display of cyanogen products including prussiate of potash and a range of bronze blues. Amongst other products are sulphuric acid and green copperas.

The General Chemical and Pharmaceutical Co., Ltd.

(STAND NO. A692.)

The most important part of the company's display is devoted to exhibits of Judex guaranteed analytical reagents A.R. and Judex general laboratory chemicals in the production of which considerable development has taken place during the past year. Attention is drawn to some indicators, including absorption indicators and oxidation-reduction indicators, illustrative of the wider range now available. Examples are also shown of Judex " Special Reagents " including Organic Reagents for " Spot Tests " and Micro-analysis. For the first time, the company is offering a set of 30 tubes containing one gramme each of the more important reagents in this class.

In the section of general fine chemicals, an example illustrates the work which the company has done in producing chemicals specially designed to assist the work of specific industries. This section also illustrates the production of certain dyestuffs intermediates. The exhibit also includes several chemicals of industrial importance, notably the company's Oasis accumulator acid and distilled water, Oasis potash electrolyte for nickel iron batteries, together with chemicals for use in electro-plating industries and marketed under the registered trade mark " Vulcan."

Hopkin and Williams, Ltd.

(STAND NO. A687.)

The exhibition of AnalaR laboratory chemicals is again a feature of Messrs. Hopkin and Williams stand. The production of reagents under this registered name is entirely in the hands of the two concerns, Hopkin and Williams, Ltd., and The British Drug Houses. The standards agreed by the two companies are published in " AnalaR Standards for Laboratory Chemicals."

Another class of this company's products is also accompanied by appropriate literature. " Organic Reagents for Metals " has recently appeared in its third, much enlarged, edition. Thirty-eight reagents are now treated in this book and the following are among the inclusions in the new edition : Quinaldinic acid for copper, zinc and cadmium; *p*-nitrobenzenediazoaminoazobenzene for cadmium; toluene 3 :4.dithiol for tin; and a group of reagents suitable for the detection of nitrates.

Mandelic acid has been dispensed in several forms for the treatment of urinary infections. Hopkin and Williams, Ltd., have produced the pure acid, the sodium salt, the solution of the ammonium salt and now offer the calcium salt.

Oxidation-reduction indicators are becoming increasingly important in analytical work and this firm has produced several new indicators during the past year, viz., N-phenylanthranilic acid, sodium diphenylamine sulphonate, diphenylamine sulphonic acid solution, and naphthidine.

Howards and Sons, Ltd.

(STAND NO. A688.)

Howards, of Ilford, are showing on their stand this year their Nilox Ester Oil Sr. which was evolved primarily for the worsted industry, but also for the rayon industry, as an oil superior to the best olive oil in performance, and having the additional advantages of uniform quality and stable price. It is a synthetic oil manufactured under carefully controlled conditions, and is free from mineral oil. This oil is free from any tendency to oxidise and does not cause rancidity. Howards' Sodium Lactate (Technical 80 per cent.) has made great strides during the last year as a glycerine alternative, particularly in calico printing. Their Diterpene is an most interesting product, especially for manufacturers of synthetic resin finishes and inks. This high-boiling, pale yellow, practically odourless, viscous liquid dries by oxidation to give tough films; it is 100 per cent. film forming and loses no weight on drying.

For use in the cellulose and synthetic resin lacquer trade, Howards have now put on the market two plasticisers, which have been manufactured for the first time on the large scale. These white crystalline plasticisers are of a very high degree of purity, and are also available at a much lower price than hitherto. This firm will also be demonstrating the uses of their well-established solvents and plasticisers for the lacquer, paint, plastics, leather, textile, etc., trades.

Imperial Chemical Industries, Ltd.

(STAND NO. A612/626.)

Imperial Chemical Industries have made a complete innovation this year in devoting their stand in the chemical section to one product only—a product with a long history and perhaps the most ubiquitous in industry—soda. All forms of soda are made by I.C.I. (Alkali), Ltd., at their works at Winnington, Northwich, Cheshire. The uses of soda will be traced back to glassmaking and embalming in ancient Egypt; through its agricultural production in the middle ages to the development of the LeBlanc process at the end of the 18th century and the introduction of the now almost universal ammonia-soda process in the middle of the nineteenth. Specimens will be shown of soda made by the LeBlanc process and exhibited at the Great Exhibition of 1851. Exhibits will illustrate the history of the industry at Winnington from the adoption of the ammonia-soda process by Ludwig Mond and John Brunner in 1873 to the present day.

An illuminated flowsheet will show the more important stages in the manufacture of sodium carbonate, bicarbonate of soda and caustic soda from rock salt, limestone and coal. A complete range of these alkalies will be displayed and their uses and developments illustrated photographically. The scope of the Research Department of the Alkali Group of I.C.I. will also be indicated.

Johnson and Sons, Manufacturing Chemists, Ltd.

(STAND NO. A633.)

On this stand a complete series of the photographic chemicals, such as Amidol, Metol, Pyro, hydroquinone, chlorquinol, Glycia, Azol, also compound developers as required by the various branches of the photographic industry are shown.

The continued increase in miniature photography has necessitated changes in the nature of some of the formulæ and also has demanded a considerable amount of research to find developing agents with special characteristics such as the giving of fine grain in the image. The result of this research enabled the firm to patent a new chemical under the name of Meritol and they are making a special feature of this again this year.

Johnson, Matthey and Co., Ltd.

(STAND NO. E1,240.)

As on other occasions in recent years, this company will have a large stand at Castle Bromwich, Birmingham, in addition to that at Olympia, and the exhibits of industrial interest will be mainly displayed at the former site. Among the exhibits of interest to the scientific and industrial visitors to Olympia will be examples of platinum laboratory apparatus; silver solders for use on a variety of metals; electrical contacts in precious metals; silver-on-copper and silver-on-phosphor bronze bi-metal for contact purposes; and precious metal chemicals.

During 1937, the company developed a new factory at Ealing for the production of very fine tube, and examples of such tube will be shown for the first time.

Monsanto Chemicals, Ltd.

(STAND NO. A630668.)

In view of the considerable increase that has occurred recently in the number of chemicals manufactured at Monsanto's Ruabon works, the exhibition stand this year displays a considerably more varied range of chemicals. These are classified into sections and are exhibited in these separate sections in such a way as to appeal to the varied industries interested. These main divisions are:—(a) phenols and cresols of interest to the plastics industry and the fine chemicals market; (b) chemicals including accelerators for use in the manufacture of rubber; (c) fine chemicals, including a number of pure chemicals for general industry; (d) phthalic anhydride and its various derivatives such as phthalic esters. This display is of particular interest to manufacturers of resins both glyptal and derivatives of cellulose. In connection with this display there are also shown benzoic acid and sodium benzoate, which are manufactured from Monsanto phthalic anhydride; (e) germicides, including disinfectants.

Phenol is offered in three forms—ice crystals melting at 40/41° C., detached crystals melting at minimum 41° C. and liquefied crystals manufactured to the B.P. 1932 specification. The display of rubber chemicals comprises a complete range of Monsanto accelerators, anti-oxidants, softeners, mould paste and sponge paste. It also includes a representative selection of colours for rubber and Curodex odorants for rubber.

Monsanto specialise in the manufacture of derivatives of salicylic acid and a full range of these is shown, including salicylic acid B.P. crystals, powder and technical. Phenacetin is also being shown, in both crystal and powder form. In addition there will be a display of vanillin, consisting of vanillin Monsanto and Ethavan (ethyl vanillin) and this also includes synthetic vanillin. This year ortho anisidine, ortho phenetidin and para phenetidin are being displayed for the first time.

The range of phthalic anhydride and phthalic esters has been increased this year by a display of dimethyl phthalate and now comprises a full range of phthalic esters. The range of Hibitite inhibitors for steel pickling has been extended this year by the inclusion of Hibitite F.

The range of germicides has been increased appreciably during the last year and a comprehensive display is now shown of materials suitable for practically all of the major problems where preservatives are required. In addition a range of materials is shown which is suitable for the manufacture of non-poisonous antiseptics.

South Metropolitan Gas Co.

(STAND NO. A632.)

"Metro" coal tar and ammonia products resulting from the purification of coal gas and the distillation of coal gas tar are the products shown on this stand. "Metro" sulphate of ammonia can be stored for long periods without changing. Its content is as much as 25.71 per cent. ammonia—equal to 21.14 per cent. nitrogen. "Metro" disinfectant fluid for general purposes now has an increased Rideal-Walker coefficient of 11 at no increase in price. "Metrotect" for protective treatment of outdoor ironwork, is a bituminous paint easy to apply and flows very readily under the brush; does not crocodile even in the most exposed positions and has exceptional anti-corrosive and waterproof properties. "Metro" creosote is ideal for preserving outdoor woodwork—either by direct application in the cold state or by impregnation under heat and pressure. Other products comprise "Metrotect" bituminous paint, "Metro" creosote solid smokeless fuels, motor benzole, anthracene, sharp oil, pyridine, sulphuric acid, sulphate of iron, coal tar pitch, etc.

Thomas Tyrer and Co., Ltd.

(STAND NO. A666.)

Thomas Tyrer and Co., Ltd., are showing numerous examples typical of the extensive range of Fine and Technical Chemicals manufactured at their works. There is on view a representative selection of inorganic chemicals conforming in purity to the specifications of the British Pharmacopœia and the British Pharmaceutical Codex; of these mention may be made of samples of bismuth salts, scale preparations, citrates of soda and potass and a varied range of the regular requirements for the pharmaceutical trade.

As regards technical chemicals, the firm is exhibiting various samples of standardised products of their manufacture which are in regular use in industries.

Whiffen and Sons, Ltd.

(STAND NO. A627.)

Development work carried out by this firm during the past year is exemplified by exhibits on the stand. Caffeine has been converted into chlor-caffeine and hydroxycaffeine, the latter of which can be used as a substitute for caffeine when stimulatory effects are desired. Camphorsulphonates are being increasingly used to replace the inorganic hydrochlorides and sulphates of alkaloidal salts. Several such alkaloidal salts, such as emetine camphorsulphonate, have been prepared, and the most recent are ephedrine camphorsulphonate and adrenaline camphorsulphonate.

The iodo-organic acid derivatives are an important group of compounds which has been prepared during the past year. Iodobenzoic acid is prepared from anthranilic acid, and then by subsequent oxidation, first iodosobenzoic acid and then iodoxybenzoic acid are formed. The latter acid is the most important, particularly in the form of its salts, which are used in cases of rheumatism and arthritis. A similar group of compounds which have been prepared are the iodosalicylates.

One of the most interesting substances recently prepared is nicotinic acid. This has been shown to be closely associated with vitamin-B_2. Administration of nicotinic acid to humans affected with pellagra has shown pronounced curative effects. Valuable nicotinic acid derivatives have also been prepared.

To the phenylmercuric nitrate and chloride prepared last year, have been added phenylmercuric acetate and iodide. Other related new preparations are mercury diethyl, ethylmercuric chloride, and ethylmercuric phosphate. During the past year the range of bromine and iodine compounds has been considerably extended.

Williams (Hounslow), Ltd.

(STAND NO. A628.)

As in previous years this company will be showing dyes for all types of leather, either for staining or for dyeing in the drum, as well as colours for synthetic resins, cellulose lacquers, oil and spirit varnishes, inks, wood-stains, soaps, candles, etc.

A particularly interesting exhibit will be the new range of dyestuffs for use on aluminium. These colours, known as anodic dyes, meet a very long-felt want in the trade and some extremely beautiful effects are obtainable. There will also be a display representative of the harmless confectionery colours which Messrs. Williams supply, including the newer colours such as Sunset Yellow FCF., Brilliant Blue FCF., Ponceau SX., etc.

A New Building Material

Synthetic Resin as Binder

DETAILS of the manufacture and properties of a building material made from synthetic resin are given in *Plastics* (1938, *2*, 16-18). This material is prepared from a highly viscous synthetic resin binder, which is made into a semi-coherent powdery dough with a pure silica filler; cement, lime, wood-flour and bitumen are thus entirely absent. The "dough" can be cold-pressed to give a material which will harden at ordinary temperatures to an extraordinary degree of toughness and strength; the hardening proceeds more rapidly at about 170° C. Among special applications of the new material is the making of jointless flooring.

"The British Trade Journal"

75th Anniversary

THIS month our contemporary *The British Trade Journal and Export World* celebrates its 75th anniversary. It was established just at the time when the modern business world was looking for a connecting link between the merchant and manufacturer in this country and the importer abroad and in the Empire. The founders were a firm of London export merchants who did a world-wide trade in all classes of manufactures, and since their journal was the first of its kind ever published, it met with immediate success. Within a few years a special edition was issued in Spanish and this was followed in due course by editions in Dutch, Italian and French, the latter coinciding with the Paris Exhibition of 1889. A new proprietor, Mr. W. J. Rivington, extended the influence of *The British Trade Journal* still further by visiting Japan, where he founded a Japanese edition printed in Tokio and later a Chinese edition was published in Shanghai. Not content with this enterprise, Mr. Rivington started a Russian edition in Moscow in 1897, this appearing until the outbreak of the Russo-Japanese war.

Our contemporary was acquired by Benn Brothers, Limited, proprietors of *The Chemical Age*, in 1929, when it was amalgamated with *The Export World*. Some months later a Portuguese Supplement was introduced, and in 1931, Mr. John Benn visited South America and Portugal on behalf of the journal. In 1935 Mr. K. E. Hughes made a similar tour of Scandinavia. The recent revival in British overseas trade is happily reflected in the size of the current issue, which is the largest published by our contemporary since 1929.

Ten Years Back

From "The Chemical Age", February 15, 1928

German deliveries in kind, under the reparations scheme, amounted in value last year to £28,920,000, of which chemicals delivered amounted to £2,850,000 and dyestuffs to £580,000.

* * * *

From the estimates for the Chilean budget it is deduced in some quarters there will be a reduction on the export duty at the half-year unless the Chilean Government has calculated on smaller sales of nitrates.

* * * *

The directors of the Cheshire United Salt Co., Ltd., announce that the extension of plant originally decided upon has been completed within the stipulated time, and the output of salt has been doubled since March last. The profits now being earned are stated to be in excess of estimates, and as the demand for the company's products still exceeds its output capacity, it has been decided to proceed at once with further extensions.

* * * *

Olive oil production in Portugal in 1927 is said to have been a record. The total production for the whole country is given as 1,139,729 hectolitres of oil, which is far in excess of the quantity required for consumption in Portugal, so that provided the type of oil is such as to meet foreign taste, there should be a considerable export trade in this article. There are said to be in the country 23,283,900 olive trees of bearing age.

* * * *

In reply to Mr. Duckworth (House of Commons, February 9), Mr. Guinness stated that nineteen beet sugar factories had been built in Great Britain, all of which were in receipt of the subsidy except one factory, working the desiccation process, which had not yet submitted claims. There were schemes for the erection in 1928 of beet sugar factories at Brigg (Lincolnshire), Chicester (Sussex) and Bridgwater (Somerset).

Chemical Matters in Parliament

Import Duty on Lithopone

IN the House of Commons on February 14, the Parliamentary Secretary of the Board of Trade (Captain Evan Wallace) moved the approval of Additional Import Duties (No. 1) Order, 1938, dated January 31, 1938, which proposed to impose a specific duty of £3 5s. per ton on lithopone, as an alternative to the existing duty of 20 per cent. ad valorem. He pointed out that the United Kingdom production of this material is in the hands of three firms, the principal two of which are located in Lancashire. The whole industry has developed appreciably since the introduction of tariffs, like many other industries which have been subjected to this beneficial process, and a substantial export trade has been built up.

Mr. Benn pointed out that the United Kingdom has a large export trade in paint, and he was told by paint manufacturers that if you cannot get a sale of white paint, of which lithopone is an important component, you do not get a sale of any paint. If these manufacturers are subjected to a duty upon lithopone it is a blow at the whole of their export trade. He therefore wanted to know whether there would be a drawback. If paint manufacturers import lithopone and use it in making paint which they afterwards sell abroad, in the hottest competition with foreign paint manufacturers, and have to pay a duty upon the lithopone, then obviously they will be seriously handicapped.

Mr. Acland said he appreciated that the advisory committee may receive a good deal of information which is confidential, but surely a matter of fact, like the production of the home industry, as to which there can be no dispute, ought to be made known to the House before being asked to decide whether a duty should be granted or not. A hint was dropped by the right hon. Member for Gorton (Mr. Benn) that the figures, if they were given, would show a decrease last year. The figures one has show that in 1933 production was 30,000 tons and in 1935 38,000 tons, a quite handsome rate of increase. As regards the export trade, in 1930 it was 2,000 tons; 1933, 4,000 tons; 1935, 6,000 tons; 1937, very nearly 8,000 tons. None of those figures indicated that the industry is in a bad way. Imported lithopone had fallen by 5 per cent. in price in the last few years, if by no more, and home prices had been materially reduced, presumably because methods of manufacture are such that they can be reduced; if the foreigner is using those methods it is not surprising that foreign prices have fallen along with ours.

Miss Wilkinson said the matter concerned her constituency (Jarrow) where there is one of the largest paint works in the country. The Order is serious for this industry, whose raw material is to be taxed. If the Minister gave the whole facts and said, "There is this special reason why this duty should be levied," then at least we could weigh up the supposed advantages to the lithopone industry (which seems to be doing very well) against the disadvantage of increasing the price of raw materials to an old-established export trade.

Captain Wallace said that British prices to the consumers in these manufacturing and exporting industries have been reduced as a result of the tariff. The home manufacturers of lithopone have been enabled to produce on a bigger scale and more effectively, and they held three-quarters of the home market in 1935. But since then there has been this alarming increase in imports. Imports from all countries have gone up from 10,381 tons in 1935 to 15,639 tons in 1937.

Mr. Acland: Will the right hon. and gallant gentleman give the figure for 1934? He has taken the very lowest figure.

Captain Wallace: The imports have gone up 50 per cent.

Upon the question being put, the House divided: Ayes, 199; Noes, 127.

A NEW process for making titanium dioxide has been developed by an engineer in Osaka. The raw material is a by-product from the treatment of vanadium ores.

British Overseas Chemical Trade in January

ACCORDING to the Board of Trade returns for the month ended January 31, 1938, exports of chemicals, drugs, dyes and colours were valued at £1,936,790, as compared with £1,831,364 for January, 1937, an increase of £105,426. Imports were valued at £1,063,119, as compared with £1,112,360, a decrease of £49,241. Re-exports were valued at £38,681.

Imports

	Quantities. January 31. 1937.	Quantities. January 31. 1938.	Value. January 31. 1937.	Value. January 31. 1938.
Acids—				
Acetic .. .. cwt.	14,880	7,930	16,514	9,427
Boric (boracic) .. ,,	700	3,160	709	3,411
Citric .. .. ,,	2,645	2,710	10,620	11,028
Tartaric .. ,,	2,639	1,277	10,825	5,686
All other sorts .. value	—	—	4,756	9,224
Borax .. .. cwt.	6	12,650	22	7,540
Calcium carbide .. ,,	103,472	109,896	54,692	58,487
Fertilisers, manufactured—				
Superphosphate of lime tons	2,245	530	4,650	1,318
All other descriptions ,,	2,822	1,107	12,682	6,774
Potassium compounds—				
Caustic and lyes cwt.	12,529	8,314	12,957	9,036
Chloride (muriate) ,,	45,318	80,004	17,734	29,723
Kainite and other potassium fertiliser salts cwt.	70,364	52,960	9,387	7,059
Nitrate (saltpetre) ,,	5,865	2,330	4,564	1,994
Sulphate .. .. ,,	55,245	30,920	18,888	14,342
All other compounds ,,	7,762	8,499	9,980	10,790
Sodium compounds—				
Carbonate, including crystals, ash and bicarbonate .. cwt.	454	454	318	225
Chromate and bichromate .. .. cwt.	2,032	1,003	2,368	1,314
Cyanide .. ,,	7,069	236	17,206	692
Nitrate .. .. ,,	130,700	55,603	28,642	13,119
All other compounds ,,	27,988	19,101	20,461	22,742
Other chemical manufactures .. .. value	—	—	308,489	338,461
Drugs, medicines and medicinal preparations—				
Quinine and quinine salts .. .. oz.	52,225	155,423	4,886	12,836
Medicinal oils .. cwt.	3,821	3,802	11,044	10,993
Proprietary medicines value	—	—	37,251	60,298
All other sorts .. ,,	—	—	72,578	48,163
Finished dyestuffs from coal tar .. .. cwt.	3,928	4,439	112,036	139,835
Extracts for dyeing ,,	3,785	2,619	7,220	5,834
Extracts for tanning (solid or liquid)—				
Chestnut .. cwt.	19,656	23,612	13,632	16,242
Quebracho .. ,,	103,087	22,330	91,056	20,347
All other sorts .. ,,	51,777	37,491	37,320	32,146
All other dyes and dyestuffs .. .. cwt.	955	1,604	17,732	36,140
Painters' colours and materials—				
White lead (basic carbonate) .. cwt.	9,187	5,706	12,765	8,289
Lithopone .. ,,	37,122	22,149	22,700	14,195
Ochres and earth colours cwt.	12,178	33,378	4,888	10,458
Bronze powder ,,	1,329	1,231	8,954	8,912
Carbon blacks .. ,,	39,140	30,978	56,145	42,715
Other pigments and extenders, dry .. cwt.	35,143	30,814	9,067	8,816
All other descriptions ,,	14,213	11,021	26,622	24,508
Total .. .. value	—	—	1,112,360	1,063,119

Exports

	Quantities. January 31. 1937.	Quantities. January 31. 1938.	Value. January 31. 1937.	Value. January 31. 1938.
Acids—				
Citric .. .. cwt.	2,033	2,872	8,864	12,727
All other sorts .. value	—	—	19,840	20,628
Aluminium compounds tons	2,239	2,265	21,035	24,932
Ammonium compounds—				
Sulphate .. tons	17,989	21,623	111,908	145,572
All other sorts .. ,,	1,192	1,600	14,985	19,830
Bleaching materials—				
Bleaching powder (chloride of lime) .. cwt.	58,393	56,291	14,684	13,367
All other sorts .. ,,	6,669	3,102	17,389	8,969
Coal tar products—				
Cresylic acid .. galls.	179,817	196,995	25,863	36,009
Tar oil, creosote oil ,,	3,245,864	2,709,055	80,435	73,451
All other sorts .. value	—	—	23,154	20,315
Copper, sulphate of tons	773	2,230	13,033	37,658
Disinfectants, insecticides, etc. .. .. cwt.	31,838	29,047	62,888	55,361
Fertilisers, manufactured tons	37,053	15,127	91,233	74,330
Glycerine .. .. cwt.	13,874	15,331	44,318	61,965
Lead compounds .. ,,	15,244	15,013	23,411	20,605
Magnesium compounds tons	356	364	8,753	9,056
Potassium compounds cwt.	2,509	3,306	7,735	6,870
Salt (sodium chloride) tons	23,836	17,133	65,442	47,279
Sodium compounds—				
Carbonate, including crystals, ash and bicarbonate .. .. cwt.	450,481	317,513	80,559	74,757
Caustic .. .. ,,	233 919	226,730	89,268	128,770
Nitrate .. .. ,,	81	207	63	64
Sulphate, including salt cake .. .. cwt.	52,836	32,011	4,314	3,340
All other sorts .. ,,	62,127	68,173	80,881	68,507
Zinc oxide .. tons	1,306	876	24,046	18,927
All other descriptions value	—	—	206,220	193,481
Drugs, medicines and medicinal preparations—				
Quinine and quinine salts .. .. oz.	104,181	187,558	11,741	20,605
Proprietary medicines value	—	—	93,178	143,516
All other descriptions ,,	—	—	128,473	152,026
Dyes and dye-stuffs and extracts for tanning—				
Finished dye-stuffs from coal tar—				
Alizarine, alizarine red and indigo (synthetic) cwt.	1,935	1,357	9,817	8,973
Other sorts .. ,,	7,486	7,261	100,849	99,296
Extracts for tanning (solid or liquid) cwt.	24,808	19,172	19,033	16,753
All other descriptions ,,	1,283	1,321	5,604	6,899
Painters' colours and materials—				
Ochres and earth colours cwt.	14,929	9,851	15,118	10,511
Other descriptions ,,	19,040	18,177	32,251	31,720
White lead .. ,,	7,035	3,408	14,874	7,234
Ships' bottom compositions .. .. cwt.	3,722	2,245	12,729	8,355
Paints and painters' enamels, prepared .. cwt.	45,196	42,700	115,294	118,624
Varnish and lacquer (clear) galls.	75,871	72,534	30,203	28,642
Printers' ink .. cwt.	4,480	4,850	27,397	24,294
All other descriptions ,,	40,645	39,174	74,482	82,572
Total .. value	—	—	1,831,364	1,936,790

Re-Exports

	Quantities. January 31. 1937.	Quantities. January 31. 1938.	Value. January 31. 1937.	Value. January 31. 1938.
Chemical manufactures and products .. value	—	—	26,089	27,526
Drugs, medicines and medicinal preparations, value	—	—	13,059	9,248
Dyes and dye-stuffs and extracts for tanning cwt.	1,841	637	2,227	1,011
Painters' colours and materials .. .. cwt.	2,263	371	2,074	896
Total .. value	—	—	43,449	38,681

References to Current Literature

Inorganic

Activation of oxides. Schenk and Kurzen, *Z. anorg. Chem., 235,* 97-109.

Anhydrous rare earth iodides. Talbel and Hopkins, *Z. anorg. Chem., 235,* 62-64.

Tricalcium aluminate hexahydrate. Travers and Zahabi, *Compt. rend., 205,* 1,407-1,409.

Formation of ozone in an A.C. discharge tube. Senkers, *Canadian J. Research, 15,* B, 525-528.

Catalysis in ammonia solutions. Burgess and Kahler, *J. Amer. Chem. Soc., 60,* 189-192.

Preparation of nitrous oxide. Baumgarten, *Ber., 71,* 89-81.

Organic

Formation of organic acids by bacteria. Franke and Peris, *Biochem. Z., 295,* 61-90.

Production of benzene in the polymerisation of acetylene. Rosenblum, *Bull. Soc. Chim. Belg., 46,* 503-518..

Polymerisation of propylene by phosphoric acid. Monroe and Gilliland, *Ind. Eng. Chem., 30,* 58-63.

Nitrating paraffin hydrocarbons. McCleary and Degering, *Ind. Eng. Chem., 30,* 64-67.

Chemistry of collagen. Highberger, *J. Amer. Leather Chem. Assoc., 33,* 9-15.

Antiseptic compounds of sulphur. Prevost, *Manuf. Chem., 9,* 11-12.

Viscosity and chemical constitution. Souders, *J. Amer. Chem. Soc., 60,* 154-158.

Maleic acid production. Faith and Schaible, *J. Amer. Chem. Soc., 60,* 152-154.

Pine resin acids. Fieser and Campbell, *J. Amer. Chem. Soc., 60,* 159-170.

Analysis

Identification of phenols. Eegrive, *Mikrochem., 23,* 173-175.

Detection of cobalt, copper and nickel. Thomson, *Mikrochim. Acta, 2,* 280-282.

Determination of iron in aluminium alloys. Dietrich and Schmitt, *Z. analyt. Chem., 111,* 176-178.

Analysis of mixtures of strong and weak acids, buffer and neutral salts. Barker, Rohwer and Shuttleworth, *J. Inter. Soc. Leather Trades' Chem., 22,* 2-18.

Analysis of perfumes and ethereal oils. Kaufmann, Baltes and Josephs, *Fette u. Seifen, 44,* 506-508.

Detecting and estimating diacetyl and methyl acetyl carbinol in margarine and butter. Schmalfuss and Werner, *Fette u. Seifen, 44,* 509-514.

Technical gas analysis by conductivity methods. Andress, *Gas u. Wasserfach, 80,* 922-925.

Microchemical technique. Lieff, Marks and Wright, *Canadian J. Research, 15,* B, 529-531.

Determination of molybdenum. Birnbaum and Walden, *J. Amer. Chem. Soc., 60,* 64-66.

Mineral Oils, Gas, Tar

Phenol recovery. Lorenzen, *Gas u. Wasserfach, 80,* 925-928.

Cresol as solvent in the refining of lubricating oils. Suida and Pöll, *Petroleum Z., 34,* No. 2, 1-14.

Polymerisation of unsaturated hydrocarbons. Waterman and Leenderze, *J. Inst. Petroleum Techn., 24,* 16-37.

Determining the volatile content of lubricating oils. Brückner, *Angew. Chem., 51,* 53-55.

Cellulose, Paper

Ethyl cellulose films. Ouchakow and others, *Rev. Générale Matières Plastique, 35,* 301-304.

Alkaline treatments of pulp. Jayme, *Paper Maker, 95,* 3-7.

Delignification of wood by strong alkaline solutions. Lusby and Maass, *Canadian J. Research, 15,* B, 536-544.

Bleaching, Dyeing, Finishing

Insoluble azo-dyestuffs. Diserens, *Teintex, 3,* 9-27.

Bleaching of cellulosic fibres. Mueller, *Teintex, 3,* 2-37.

Structure and absorption of dyestuffs: Fluorescein. Ramart-Lucas, *Compt. rend., 205,* 1,409-1,411.

Natural textile gums. Searell, *Dyer, 79,* 25-27.

Treatment of rayon and cellulose acetate silk. Mitcheson, *Dyer, 79,* 41-43.

Discharging of dyeings. Wahl, *Rev. Générale Matières Colorantes, 42,* 23-25.

Determining oil and soap in textile materials. Ryberg, *Amer. Dyestuff Reporter, 72,* 8-13.

Reducing agents in textile printing and dyeing: Titanium salts, zinc dust. *Text. Colorist, 60,* 9-12.

X-ray study of the dyeing of wool. Astbury and Dawson, *J. Soc. Dyers Colourists, 54,* 6-16.

Glass, Ceramics

Vitreous enamels. Judd, Harrison and Sweo, *J. Amer. Ceramic Soc., 21,* 16-23.

Chemical and technical advances in glass manufacture. Schmidt, *Chem. Ztg., 62,* 37-41.

Boric anhydride glass. Rencker, *Compt. rend., 205,* 1,396-1,398.

Metals, Electrometallurgy

Preparation of electrodeposits. *Metallwaren Ind. u. Galvano Techn., 36,* 29-31.

Working temperature of galvanic baths. Krämer, *Metallwaren Ind. u. Galvano Techn., 36,* 31-33.

Rochelle salt copper plating baths. Jeveli, *Amer. Electroplaters' Soc. Rev.,* 1937, 921-925.

Pickling ferrous alloys. Hall, *Amer. Electroplaters' Soc. Rev.,* 1937, 905-920.

Effect of oxygen on the corrosion of steels. Frese, *Ind. Eng. Chem., 30,* 83-85.

Action of molten zinc on iron and steel. *Metal Treatment, 11,* 171-172.

Treatment of oxide manganese-silver ores. Spies, *Metall u Erz, 35,* 1-6.

Electrodeposition of tin. Stout and Baum, *Metal Ind., 52,* 157-160.

Fats, Oils, Waxes

Newer detergents. Mullin, *Soap, 14,* No. 1, 30-33, 74.

Catalytic hydrogenation of fats. Kaufmann, *Fette u. Seifen, 44,* 514-518.

Standoil production. Kappelmeier, *Paint Oil Chem. Rev., 100,* No. 1, 517.

Chemistry of the fatty acids: linoleic acid. Brown and Frankel, *J. Amer. Chem. Soc., 60,* 54-56.

Paints, Pigments, Resins

Preparation of lime-hardened resins. Blin, *Matières Grasses Pétrole et Dérivés, 30,* 10-12.

Fluorescence analysis of paint raw materials. *Paint Varnish Prod. Manager, 18,* 16-20, 32.

Weatherproofing rust-protective paints. Wilborn and Lowa, *Farben Ztg., 43,* 57-59.

Types of shellac. Lübke, *Farbe u. Lack,* 1937, No. 51, 619-620.

Insoluble azo colours. Rowe, *Oil Colour Trades J., 93,* 355-359.

Aluminium naphthenate in surface coatings. Aldred, *Paint Techn., 11,* 373-374.

Rubber, Plastics

Phenols and plastics. Morgan and Pettet, *J. Soc. Dyers Colourists, 54,* 17-23.

Styrene and its polymers. Stanley, *Chem. and Ind., 57,* 93-98.

Effect of softeners in filled rubber mixes. Behre, *Kautschuk, 14,* 6-12.

Miscellaneous

Casein adhesives. Partisch, *Seifensieder Ztg., 64,* 991-992.

Explosion liabilities of compressed ethylene oxide, hydrogen cyanide and carbon disulphide. Peters and Ganter, *Angew. Chem., 51,* 29-33.

Personal Notes

PROFESSOR F. C. THOMPSON, of the University of Manchester, has been appointed external examiner in metallurgy for the M. Met. thesis at Sheffield University.

THE LATE MR. CHARLES CAMPBELL CRAWFORD, retired oil depot inspector, Glasgow, has bequeathed £5 to the Royal Infirmary, Dumfries.

DR. E. R. TROTMAN gave an interesting survey of the history of textile dyeing industry at University College, Nottingham, last week.

MR. C. COBB, of the British Oxygen Co., Ltd., Derby, gave an address on "Liquid Air" to members of the Matlock Rotary Club on February 7.

SIR ERNEST SIMON, of Henry Simon, Ltd., and Simon-Carves, Ltd., has accepted the invitation to be the president of the Stockport Chamber of Commerce.

MR. W. W. KAY, lecturer in chemical pathology at the University of Manchester, has resigned this post on his appointment as assistant pathologist to the London County Council.

DR. CARL GEHRKE, managing director of the Continental Gummi Works, A.G., has retired after being in the service of the company for fifty years. He has been succeeded by Dr. K. KONECKE.

CAPTAIN ALFRED INSTONE, vice-chairman of S. Instone and Co., Ltd., and a director of Doncaster Coalite, Ltd., is standing as a candidate in the Aldgate Ward for the Court of Common Council, London.

PROFESSOR J. B. S. HALDANE is supporting a manifesto by the London Trades Council calling for the protection of civilians from air attack. He states that the Government's measures against poison gas are "inadequate."

MR. JOHN WILLIAM IVORY, managing director of Job, Ivory and Co., Ltd., oil merchants and refiners, Liverpool, has been elected vice-president of the Seed, Oil, Cake and General Produce Association, Liverpool. He has been chairman of the Whale Oil and Fish Oils Committee of the Association for several years.

COLONEL FREDERICK POPE, president of the Nitrogen Engineering Corporation, United States, is now on a visit to England. He built the first dye plant in the United States at the beginning of the war. The American Government utilised Colonel Pope's expert knowledge to reorganise the Chemical Warfare Service of the American Expeditionary Force.

MR. PETER LLOYD, a research chemist in the employ of the Gas Light and Coke Co. is accompanying the 1938 Mount Everest Expedition, which has just arrived in India. The expedition of this year is the seventh to visit the mountain, and the fifth to attempt to climb it. In 1936, with the British-American party, Mr. Lloyd carried a load to the high bivouac at 23,500 ft. on Nanda Devi, and proved to be very much at home on difficult rock and in severe conditions at that height.

SIR WILLIAM ALEXANDER, M.P. for the Central Division of Glasgow, who is a director of British Celanese, Ltd., Canadian Celanese, Ltd., the Celanese Corporation of America, and the Petroleum Storage and Finance Corporation, Ltd., was present at the annual "At Home" of the Glasgow Central Division Unionist Association on February 12. He spoke briefly to welcome the company, and referred to his recent decision to retire at the next General Election, but said that he was of the opinion that it would be two years before such an event took place.

OBITUARY

MR. WILLIAM SPEIRS, of W. N. Gemmill and Co., chemical merchants, Glasgow, died on February 14. He was a Justice of the Peace for Lanarkshire.

MR. CHARLES POLLOCK, Paisley, who since 1909 has been associated with Isdale and McCallum, soap manufacturers, Paisley, died on February 11.

MR. HERBERT R. BROWNE, technical director of the Michigan Alkali Co., Huron Portland Cement Co., J. B. Ford Co., and vice-president of the Detroit Soda Products Co., died on January 19, following an operation. Mr. Brown was born in Manchester in 1871, and came to America when 21 years of age. He was the first chemist of the Michigan Alkali Co. He remained with that company throughout his life with the exception of four years, 1896 to 1900, when he was employed by the Mathieson Alkali Co., Saltville, Va. He was well-known both in America and in England, and indeed wherever alkali products were made or used in the industry. He served on the Naval Consulting Board during the world war, was a member of the American Chemical Society, the American Society for Testing Materials, and was particularly active on the Technical Problem Committee of the Portland Cement Association.

Foreign Chemical Notes

Roumania

THE CLOSCANI CONCERN has been granted an exclusive licence for the construction of a tanning materials factory and for the importation of the requisite equipment.

China

TEASEED OIL CAKE is reported to be finding application as a pesticide for which purpose the cake is boiled with water and the mixture poured over the plants or soil.

Sweden

AN EXPERIMENTAL PLANT FOR EXTRACTING SALT from sea-water is under construction by the Svenska Turbin A/B Ljungström, at Alsback, on the Gullmar Fiord in South-West Sweden. A freezing process is to be applied and will be more extensively adopted if the trials are successful.

Japan

PRODUCTION OF GLYCERINE BY THE FERMENTATION of molasses is intended by the Formosa Sugar Manufacturing Co.

THE HYAKUNENZAN TUNGSTEN K.K. is starting production of tungsten and ferro-tungsten, and is increasing its capital to 3.5 million yen.

Holland

CASEIN PRODUCTION WILL BE COMMENCED shortly by the Eemlandia Dairy at Bunschoten, where 40,000 litres skim milk will be available for treatment each day.

A NEW SULPHURIC ACID PLANT operated by the contact process is to be installed by the Limburg State Mines at Beek. Costing in the vicinity of 134,000 Dutch florins, the new plant is expected to be in production in the current year.

Germany

EXPERIMENTS ON THE production of a new type of collapsible tube from rayon and cellophane are being carried out by the Thüringer Kunststoff-Tubenfabrik, at Schmölln (Thuringia).

LARGE-SCALE TESTS ON THE PRODUCTION OF FATTY ACIDS from paraffin wax have now been successfully concluded by the United Oilworks Hubbe and Farenholtz, of Magdeburg, who are proceeding with the erection of a manufacturing plant.

PETROLEUM PRODUCTION IN GERMANY in 1937 reached the record level of 453,500 tons (previous year 445,000 tons). By far the greater part of this output was accounted for by wells in the Nienhagen-Hanigsen-Olnershagen group with 347,000 tons (previous year 330,000 tons). A corresponding increase in the personnel employed in this industry has been recorded, the figures for 1935, 1936 and 1937 being given as 4,136, 4,770 and 5,191.

From Week to Week

SCARCITY OF SCRAP METAL is given as the reason for closing down a furnace at the Clydesdale Steel Works of Stewarts and Lloyds, Mossend. The major plant was transferred to Corby, Northamptonshire, several years ago.

THE OFFICIAL PRICE OF PLATINUM was raised by 10s. an ounce on February 11 to £7 10s. This is the first check to the steady decline in the official quotation which has persisted for several months. The price a year ago was £14.

TWO WELL-KNOWN SCOTTISH ARTISTS, Mr. Donald Moodie (president of the Society of Scottish Artists) and Mr. Robert H. Westwater, are working on the task of decorating the interior of Imperial Chemical Industries' Pavilion at the Empire Exhibition at Bellahouston Park, Glasgow.

EMPLOYEES OF THE MARLEY HILL CHEMICAL WORKS belonging to John Bowes and Partners, Ltd., have received intimation that their employment will cease on April 2, following the decision to close the works. The employers state they had tried various methods to keep the plant going, but owing to the high cost they had failed on account of the plant being out of date and the more modern plants nearby. About 250 employees are affected.

THE FIRST AIR FREIGHT INFORMATION BUREAU in Britain and believed to be the first in Europe, was opened on February 10. Increasing numbers of inquiries are being received by the Board of Trade, regarding the import and export of goods by air. The object of the new bureau, to be conducted by International Air Freight, Ltd., is to supply British manufacturers, merchants and the professions with a comprehensive inquiry service on the possibilities in every trade and industry of air freightage throughout the world.

THE BRITISH NATIONAL COMMITTEE of the World Power Conference has issued a complete official list of the British papers which are being prepared for presentation at the sectional meeting of the World Power Conference which is to be held in Vienna, August 25 to September 2, 1938. Copies of the technical programme may be obtained now, and copies of the general programme, time-table and membership application form will be obtainable in due course, from The British National Committee, World Power Conference, 36 Kingsway, London, W.C.2.

THE NEW YEAR HAS OPENED RATHER BADLY for the china clay industry, according to the shipping statistics for January, the total tonnage dealt with being 42,343 tons, which is the lowest monthly turnover since 1931. There were 69,240 tons despatched in January, 1937, and 61,779 tons in January, 1936. The reason attributed for this temporary lull is the rough weather, and a rush towards the end of last year for buyers to stock prior to the advanced prices which come into operation with the new year. Just a slight increase to meet the advancing cost of production.

STOPPAGE AT A NORTH-EAST COAST PLANT affected the British steel output in January, which, nevertheless, at 1,081,400 tons, achieved the highest rate recorded for the first month of any year. Allowing for days lost, there was no decline in the effective rate of working during January. According to the British Iron and Steel Federation, production of pig iron in January included 175,500 tons of hematite, 411,200 tons of basic, 138,000 tons of foundry, and 16,600 tons of forge pig iron. There were 130 furnaces in blast at the end of January, compared with 133 furnaces at the end of December, three furnaces having ceased operations during the month.

COMBINED OPTICAL INDUSTRIES, LTD., have now completed their factory at Slough, for making lenses by the moulding of highly transparent plastic materials. During the past year, work on new materials and optical formulae has progressed in their London laboratory simultaneously with the erection of the factory at Slough, and the new lenses will soon be on the market. In refractive index and dispersion the plastic materials which are used resemble crown glass, their transparency, especially in the ultra-violet, is so high that the loss of light by absorption is appreciably less. Hitherto plastics have had the drawback of softness, giving a surface easily scratched, but the process now perfected gives a surface hardness that will withstand all normal usage.

THE LATEST ADDITION TO THE GOVERNMENT-AIDED TRADING ESTATE at Treforest, Glamorgan, is a factory for the commercial production of foods frozen by a new process, which, it is claimed, will keep any kind of vegetable or fruit in perfect condition for long periods. There is already a plant under construction at Treforest for the production of dry ice, which would be used in the transportation of the frozen foods. The process which will be operated by the firm of Garden Fresh Fruits, Ltd., is described by Mr. W. S. Josephson, technical director, as one in which a thin film of water-ice is frozen round each vegetable, the result being a great cake of ice, which is 90 per cent. produce and 10 per cent. ice. The American inventor, Professor A. B. Haslacher, obtained the idea from seeing prehistoric mammoths frozen in glacial ice.

THE CAMBRIDGE INSTRUMENT CO., LTD., are moving their head office and showrooms from 45 Grosvenor Place to 13 Grosvenor Place, as from February 21.

IT IS ANNOUNCED THAT negotiations between the Dean Finance Company and Messrs. Ralli Brothers for the disposal of the former's entire holding of shellac have now been completed.

THE TREASURY HAVE MADE AN ORDER under Section 10(5) of the Finance Act, 1926, exempting ethyl benzoyl benzoate from Key Industry Duty from February 13, until December 31.

BRITISH CELANESE, LTD., has acquired Bankfield Shed, the principal textile factory at Barnoldswick, near Skipton, which has been empty for about three years. The mill is believed to be the largest weaving factory in the country. It has accommodation for over 3,000 looms and was built at a total cost of £40,600.

NOW THAT THE INDUSTRIAL ALCOHOL DISTILLERIES IN EIRE are working, the Government intends to transfer control to a semi-official company with a capital of £350,000. Shares will be held by the State, and the Government will nominate the majority of the directors, but the public will be asked to subscribe new money. It is believed that special powers will be granted to the company to compel the admixture of a fixed proportion of alcohol in motor spirit for general use. This will mean an increase in the price of petrol.

THE RUBBER GROWERS' ASSOCIATION has approved the agreement for transfer of its research and propaganda activities to the new organisations envisaged under the International Rubber Regulation Scheme. Mr. A. P. Hadlow, chairman of the Association, has been appointed to represent it at the Rubber Technology Conference which will take place in London from May 23 to 25 next. Among the topics to be discussed will be the methods of improving and evaluating the durability of rubber, the technology of latex and rubber derivatives.

THE FEBRUARY ISSUE of Century Works Quarterly Review, the house journal of Elliott Brothers (London) Ltd., contains some particulars regarding the new directors of the company. Sir Percy Douglas is the inventor of various marine surveying instruments; Mr. F. A. Lawson, of Siemens Brothers and Co., Ltd., joined the Siemens Dynamo Works as a dynamo designer in 1909; Mr. D. C. Harben joined Elliott Brothers in 1904, and commenced work in the drawing office. In June, 1928, he was made assistant works manager, subsequently being appointed to the position of works manager.

AFTER A QUIETER INTERVAL, the demand for wolfram has been more active during the past week with sales of Chinese for February shipment reported up to 76s. 9d. per unit, c.i.f. The prospect of a hold-up in supplies from China and the better prices ruling in recent months has led to increased mining activity, particularly in the United States where arrangements have been made for the starting of new plants. The United States Vanadium Corporation had virtually completed the erection of a plant at Bishop, California, the output of which is expected to be on a larger scale, while the Nevada Tungsten Corporation will also be producing in the near future, and operations are to be resumed at Beauregard, near Belton Mills, California.

A NOVEL FORM OF INVITATION has been sent out for the marriage of Mr. Aubrey Townshend, the Warden of the John Benn Hostel, Stepney, and King George's House, Stockwell, to Miss Frances Waller, the Appeal Secretary of the organisation. Many hundreds of boys who have passed through the Hostels or are at present resident there, are so anxious to do honour to their Warden and his bride that Mr. W. Waller has waived the parental right to issue the wedding invitation. It has gone out in the names of the boys of the John Benn Hostel, the members of the Old Boys' Club, and the boys of King George's House, who will hold an informal reception, after the service, at the John Benn Hostel. The ceremony will take place at St. Dunstan's Church, High Street, Stepney, on Thursday, March 3, at 11 a.m.

A SHORT COURSE OF LECTURES and discussions on certain aspects of Chemical Engineering will be held at the Sir John Cass Technical Institute, Jewry Street, Aldgate, E.C.3, commencing February 23 at 7 p.m. The course has been designed primarily for students of chemical engineering, but it should also be of interest and of value to others engaged in or associated with the chemical industry. The lectures and lecturers are as follows: February 23, Chemical Works Pumping (N. Swindin, of Nordac, Ltd.); March 2, Classification and Allied Processes (R. F. Stewart, of Dorr-Oliver Co., Ltd.); March 9, Drying (T. B. Philip, of the Kestner Evaporator and Engineering Co., Ltd.); March 16, General Principles underlying Process Costs in Chemical Works (F. M. Potter, of the Gas Light and Coke Co.); March 21, Safety in Chemical Works (S. H. Wilkes, H.M. Engineering Inspector of Factories); March 23, on a subject to be announced later (C. S. Robinson, of Imperial Chemical Industries, Ltd.); March 28, Chemical Factory Organisation Personnel (E. F. Armstrong). The fee for the course is 10s.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

LUBRICATING COMPOSITIONS.—C. Arnold (Lubri-Zol Corporation). 2674.

MANUFACTURE SIMULTANEOUSLY OF PURE ALUMINIUM OXIDE AND MAGNESIUM-AMMONIUM PHOSPHATE.—C. d'Asseev. (Belgium, Feb. 1, '37.) 3114.

RUBBER LATICES, ETC.—H. Barron. 3158.

MANUFACTURE OF UNSATURATED KETONES, ETC.—A. G. Bloxam. (Switzerland, Feb. 13, '37.) 3127; (Switzerland, Jan. 4.) 3128.

INSULIN PREPARATION.—Burroughs Wellcome and Co. (U.S.A.), Inc. (United States, Feb. 1, '37.) 2990.

PROCESS FOR SEPARATING ETHER FROM MIXTURES OF ETHER and aqueous alcohol.—Buss, A.-G. (Germany, Jan. 29, '37.) 2824.

MANUFACTURE OF DRY ADHESIVE.—A. Carpmael (I. G. Farbenindustrie.) 2671.

MANUFACTURE OF VAT DYESTUFFS.—A. Carpmael (I. G. Farbenindustrie.) 2913.

MEDICINALS.—H. C. Carrington, and Imperial Chemical Industries, Ltd. 3313.

CALCIUM WOLFRAM ORE.—Degea, A.-G. (Germany, Feb. 9, '37.) 3181.

MANUFACTURE OF ORGANIC MATERIALS.—H. Dreyfus. 2617, 2902.

PRODUCTION OF OXYGEN-CONTAINING ORGANIC COMPOUNDS.—H. Dreyfus. 2795, 2797.

MANUFACTURE OF TEXTILE MATERIALS.—H. Dreyfus. 3120, 3121.

REDUCTION OF ZINC OXIDE, ETC.—F. L. Duffield. 3134.

MANUFACTURE OF FERRIC HYDRATE from waste sulphuric acid pickle.—A. J. Evans. 3091.

PREPARATION OF CHLORINE DIOXIDE.—C. H. Evans. 3123.

MANUFACTURE OF RUBBER, ETC., EXPANDED STRUCTURES.—Expanded Rubber Co., Ltd. (United States, Aug. 19, '37.) 3019.

ARTIFICIAL RESINS.—J. P. Fraser. 2992.

MANUFACTURE OF AMINO FATTY ACID DERIVATIVES.—J. R. Geigy, A.-G. (Germany, Feb. 5, '37.) 3126.

PRODUCTION OF CHROMIUM COMPOUNDS of mordant dyestuffs. J. R. Geigy, A.-G. (Switzerland, Feb. 6, '37.) 3248.

MANUFACTURE OF ALLOYS OF TUNGSTEN.—General Electric Co., Ltd., and C. J. Smithells. 2649.

MANUFACTURE OF 3-HYDROXY-4-CARBAMINO-BENZENE-1-ARSONIC ACID.—W. W. Groves (I. G. Farbenindustrie.) 2626.

MANUFACTURE OF POLYMERIC COMPOUNDS.—W. W. Groves (I. G. Farbenindustrie.) 2633.

MANUFACTURE OF POLYMETHINE DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie.) 2772.

PRODUCTION OF ALUMINIUM OXIDE.—W. W. Groves (I. G. Farbenindustrie.) 3249.

MANUFACTURE OF TUBES, ETC., from vinyl polymerides.—W. W. Groves (I. G. Farbenindustrie.) 2630.

MOISTENING OF ORGANIC PRODUCTS.—Guardite Corporation. (United States, Aug. 26, '37.) 2765.

MANUFACTURE OF ALUMINIUM ALLOY BEARINGS.—H. O. Hall. 2960.

CONDENSATION OF CITRAL with other aldehydes.—I. M. Heilbron, W. E. Jones, and J. W. Batty. 3283.

CYCLISATION OF FUNCTIONAL DERIVATIVES of unsaturated open chain aldehydes.—I. M. Heilbron, W. E. Jones, and J. W. Batty. 3284.

LUBRICATING OILS.—W. Helmore. 2782.

SOAP.—W. Howarth and Whittaker Howarth, Ltd. 3218.

MANUFACTURE OF CATALYSTS for synthesis of ammonia.—I. G. Farbenindustrie. (Germany, Jan. 29, '37.) 2589.

MANUFACTURE OF ION EXCHANGE BODIES.—I. G. Farbenindustrie. (Germany, Feb. 6, '37.) 2776.

MANUFACTURE OF HIGH MOLECULAR WEIGHT ALDEHYDES, ETC.—I. G. Farbenindustrie. (Germany, Feb. 6, '37.) 3275.

MANUFACTURE OF ELASTIC PLY FABRIC.—International Latex Processes, Ltd. (United States, Feb. 12, '37.) 2756.

SEPARATION OF CARBON BLACK from gases.—G. W. Johnson (I. G. Farbenindustrie.) 2652.

MANUFACTURE OF NITROGENOUS CONDENSATION PRODUCTS.—G. W. Johnson (I. G. Farbenindustrie.) 2653.

MANUFACTURE, ETC., OF LEUCO SULPHURIC ACID ESTERS of an anthraquinoneazine.—G. W. Johnson (I. G. Farbenindustrie.) 2654.

MANUFACTURE, ETC., OF AMINOHYDROXYQUINOLINES.—G. W. Johnson (I. G. Farbenindustrie.) 2655.

MANUFACTURE OF DRYING OILS.—G. W. Johnson (I. G. Farbenindustrie.) 3007.

MANUFACTURE OF METHYL ETHYL KETONE.—G. W. Johnson (I. G. Farbenindustrie.) 3008.

MANUFACTURE OF MOULDING POWDERS.—R. A. van Linge. (Holland, Jan. 27, '37.) 2627; (Holland, Dec. 11, '37.) 2628.

PRODUCTION OF METAL POWDERS.—H. H. Mandle. (Sept. 9, '36.) 3296.

STILBENE DERIVATIVES.—May and Baker, Ltd., A. J. Ewins, and J. N. Ashley. 3132.

MANUFACTURE OF AMIDINE DERIVATIVES.—May and Baker, Ltd., A. J. Ewins, G. Newbery, and J. N. Ashley. 3133.

MANUFACTURE OF MIXED LEAD, ETC.—National Lead Co. (United States, Feb. 10, '37.) 2770.

TREATMENT OF WASTE ACIDS.—H. Pauling. (Germany, March 16, '37.) 3297; (Germany, April 30, '37.) 3298.

OPERATION OF ION-EXCHANGE PROCESSES.—Permutit Co., Ltd. (Permutit, A.-G.). 3150.

MANUFACTURE OF WETTING, ETC., AGENTS.—Procter and Gamble Co. (United States, March 26, '37.) 3046.

PRODUCTION OF HYDROCARBON COMPOUNDS.—Soc. Industrielle des Carburants et Solvants. (France, Feb. 1, '37.) 2612.

MANUFACTURE OF DYESTUFFS.—Soc. of Chemical Industry in Basle. (Switzerland, Feb. 3, '37.) 3254; (Switzerland, Feb. 20, '37.) 3255; (Switzerland, April 8, '37.) 3256.

MANUFACTURE OF SPONGY RUBBER SUBSTANCES.—E. Solcia. (Italy, Jan. 30, '37.) 2678.

PRODUCTION OF HETEROPOLYMERIC REACTION PRODUCTS.—A. H. Stevens (Phillips Petroleum Co.). 2764.

PURIFICATION OF SUGAR FACTORY, ETC., JUICES.—D. Teatini. 3160.

MANUFACTURE OF STYRENE, ETC., COMPOUNDS.—W. J. Tennant (Dow Chemical Co.). 3162.

PYROLYSIS OF SECONDARY BUTYLBENZENE COMPOUNDS.—W. J. Tennant (Dow Chemical Co.). 3163.

DESULPHURATING, ETC., IRON.—A. Thyssen-Hütte, A.-G. (Germany, April 17, '37.) 3085.

MANUFACTURE OF REGENERATED CELLULOSE MATERIALS.—Union Chimique Belge Soc. Anon. (France, July 19, '37.) 3303; (France, Dec. 22, '37.) 3304.

PROCESS FOR PYROLYTIC REFORMING OF HYDROCARBON OIL DISTILLATES.—Universal Oil Products Co. (United States, June 30, '37.) 3146.

CATALYSTS.—W. P. Williams (Procter and Gamble Co.). 2837.

PRODUCTION OF CARBON ARTICLES.—C. B. Willmore. (United States, Jan. 30, '37.) 2903.

RUBBER LATEX SOLUTIONS.—F. W. Wren, and G. P. Boiardi. 2691.

LATEX COMPOSITIONS.—Belvedere Chemical Co., Ltd. (United States, Feb. 13, '37.) 3925.

WOOD PRESERVATIVES.—J. Bryan, and N. A. Richardson. 3554.

Specifications Open to Public Inspection

GASEOUS CEMENTATION OF STEEL.—L. Renault. Aug. 6, 1936. 24719/36.

PROCESS AND APPARATUS FOR THE PREPARATION OF A FUEL AND GAS MIXTURE.—A. P. A. C. Zu Coredo, and L. A. Wilczek. Aug. 5, 1936. 25123/36.

FERROUS ALLOYS.—Cleveland Twist Drill Co. Aug. 5, 1936. 1717/37.

RECOVERY OF A PRODUCT RICH IN ZINC from iron ores containing substantial amounts of zinc.—Huttenwerke Siegerland, A.-G. Aug. 4, 1936. 14155/37.

APPARATUS FOR MEASURING THE FLOW OF A CORROSIVE GAS.—I. G. Farbenindustrie. Aug. 1, 1936. 16874/37.

LUBRICATING-OIL ANTI-OXIDANTS.—Standard Oil Development Co. Aug. 1, 1936. 18963/37.

EXTRACTION OF GOLD and/or silver from ores and metallurgical products.—V. T. Edquist. Aug. 6, 1936. 19349/37.

PROCESS FOR PRODUCING PARAFFIN.—Studien-und Verwertungs-Ges. Aug. 1, 1936. 19878/37.

PROCESS FOR THE PREPARATION OF ARTIFICIAL RESINS.—A. Nowack, A.-G., and R. Hessen. Aug. 3, 1936. 20643/37.

PRODUCTION OF BORON-HALIDES.—E. I. du Pont de Nemours and Co. Aug. 5, 1936. 20825/37.

METHOD FOR SYNTHETICALLY PREPARING AN ESTROGENIC COMPOUND.—Parke, Davis, and Co. Aug. 6, 1936. 20936/37.

MANUFACTURE OF QUINOXALINE DERIVATIVES.—Soc. of Chemical Industry in Basle. Aug. 1, 1936. (Cognate Application, 21156/37.) 21155/37.

MANUFACTURE OF VULCANISED RUBBER.—J. R. Geigy, A.-G. Aug. 1, 1936. 21157/37.

WETTING AND PENETRATING AGENTS for alkali lyes.—Chemical Works, formerly Sandoz. Aug. 3, 1936. 21222/37.

PRODUCTION OF AZO DYESTUFFS.—Compagnie Nationale de Matieres Colorantes et Manufactures de Produits Chimiques du Nord Reunies Etablissements Kuhlmann. Aug. 4, 1936. 21341/37.

MANUFACTURE OF PITCH COKE.—Vetrocoke Soc. Anon. Aug. 4, 1936. 21444/37.

METHOD OF PRODUCING COMPRESSED BODIES from artificial resin masses.—H. Rommler, A.-G. Aug. 6, 1936. 21744/37.

MANUFACTURE OF HYPOSULPHITE.—I. G. Farbenindustrie. Aug. 7, 1936. 21905/37.

Specifications Accepted with Dates of Application

PRODUCTION OF TANNING AGENTS.—F. G. A. Enna, and Monsanto Chemicals, Ltd. Oct. 15, 1936. 478,839.

PROCESS FOR THE MANUFACTURE OF HYDROCARBON MIXTURES containing a high percentage of alkenes of high molecular weight.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Nov. 1, 1935. 478,841.

PREPARATION OF A CONDENSATION PRODUCT OF IODOFORM and guaiacol.—Chinoin Gyogyszer es Vegyeszeti Termekek Gyara, R. T. (Dr. Kereszty and Dr. Wolf). Nov. 6, 1935. 478,902.

PRODUCTION OF RUBBER THREAD.—International Latex Processes, Ltd., and R. G. James. Nov. 19, 1936. 478,903.

PROCESS FOR THE MANUFACTURE OF HYDROCHLORIC ACID from calcium chloride.—Soc. Internationale des Industries Chimiques et Derives, and A. Consalvo. Dec. 15, 1936. 478,851.

MANUFACTURE OF CELLULOSIC PELLICLES.—British Cellophane, Ltd. Jan. 4, 1936. 478,854.

DECOLORISING CELLULOSE DERIVATIVE FILMS, celluloid, and like material.—P. Colemann. Jan. 7, 1937. 478,856.

TANNING HIDES and skins.—Chemische Fabrik J. A. Benckiser Ges. Oct. 29, 1936. (Addition to 21532/36.) 478,773.

METHOD OF ACTIVATING CLAYS or like siliceous crude earths.—Oesterreichische Dynamit Nobel, A.-G. Feb. 22, 1936. 478,911.

RUBBER ACCELERATOR COMPOSITIONS.—Belvedere Chemical Co., Ltd. March 20, 1936. 478,922.

PROCESS FOR MANUFACTURING HIGHLY VISCOUS PRODUCTS obtained by the polymerisation of fatty oils.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. May 8, 1936. 478,927.

STABILISING HIGHLY VISCOUS PRODUCTS obtained by polymerisation of fatty oils.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. May 9, 1936. 478,928.

REFINING VEGETABLE OILS and the like.—H. D. Elkington. (Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij). May 7, 1937. (Convention date not granted.) 478,930.

TREATING PHENOL CONDENSATION PRODUCTS adapted for the manufacturing of phenol-aldehyde resins or products thereof.—Dorch, Backsin, and Cos. Aktiebolag. May 26, 1936. 478,988.

PROCESS FOR THE MANUFACTURE OF AMIDES of thioformic acid. F. Hoffman-La Roche and Co., A.-G. Aug. 14, 1936. 478,993.

CERAMIC MATERIAL.—Steatit-Magnesia, A.-G. June 8, 1936. 478,794.

METHODS OF PURIFYING TITANIUM SULPHATE SOLUTIONS.—United Color and Pigment Co., Inc. June 16, 1936. 479,082.

CATALYTIC TREATMENT OF MOTOR FUEL.—A. L. Mond (Universal Oil Products Co.). June 16, 1937. 478,996.

PRODUCTION OF METALLIC TITANIUM.—Deutsche Gold- Und Silber-Scheideanstalt vorm. Roessler. Sept. 10, 1936. 479,014.

PROCESS FOR THE MANUFACTURE OF CARBAZOLE DERIVATIVES.—I. G. Farbenindustrie. Aug. 2, 1935. 479,066.

SOFTENING-AGENTS FOR POLYMERISED VINYL COMPOUNDS.—G. W. Johnson (I. G. Farbenindustrie.) Aug. 10, 1936. 478,822.

PROCESS FOR PREPARING POLYBASIC ACID DERIVATIVES of hydroformed naphthas and products thereof.—Standard Oil Development Co. June 19, 1936. 479,017.

APPARATUS FOR THE REMOVAL OF CARBON MONOXIDE from gases containing hydrogen.—G. W. Johnson (I. G. Farbenindustrie.) July 31, 1936. 478,973.

MANUFACTURE OF TITANIUM PIGMENTS.—British Titan Products Co., Ltd., R. W. Anerum and A. G. Oppegaard. Aug. 7, 1936. 479,072.

MANUFACTURE AND PRODUCTION OF SYNTHETIC SUBSTANCES.—G. W. Johnson (I. G. Farbenindustrie.) Sept. 11, 1936. 478,899.

METHODS FOR THE HYDROGENATION OF HYDROCARBON containing sulphur.—P. Marecaux. May 31, 1935. 479,428.

MANUFACTURE OF ESTERS.—W. W. Groves (I. G. Farbenindustrie.) June 24, 1936. 479,122.

MANUFACTURE OF DERIVATIVES OF PARAFFIN WAX.—D. W. F. Hardie, C. Ockrent, and Imperial Chemical Industries, Ltd. July 1, 1936. (Sample furnished.) 479,195.

PRODUCTION OF MOTOR FUEL.—Anglo-Iranian Oil Co., Ltd., A. E. Dunstan, and S. F. Birch. July 29, 1936. 479,345.

PREVENTION OF CORROSION OF METALS in contact with ethylene glycol and other media for cooling internal-combustion engines, or for preventing ice formation on aircraft parts.—H. Sutton, and J. W. W. Willstrop. July 30, 1936. 479,346.

PROCESS FOR THE PRODUCTION OF HOMOGENEOUS REACTION MASSES.—Beck, Koller and Co. (England), Ltd. Aug. 1, 1935. 479,350.

HYDROGENATION OF OESTRIN and its oestrogenous derivatives. P H. Lund. Aug. 1, 1936. 479,198.

PROCESS FOR THE MANUFACTURE OF THERAPEUTICALLY VALUABLE GOLD COMPOUNDS.—Schering-Kahlbaum, A.-G. Aug. 2, 1935. (Samples furnished.) 479,358.

MANUFACTURE OF STABLE THERAPEUTIC PRODUCTS from intestinal mucous membrane.—I. G. Farbenindustrie. Aug. 1, 1935. 479,487.

PRODUCTION OF ACETYLENE.—H. Dreyfus. Aug. 4, 1936. 479,438.

RECOVERY OF ALUMINIUM COMPOUNDS.—L. Freling, and J. Dorren. Aug. 4, 1936. 479,293.

REFINING OF LIGNITE TAR, shale tar, peat tar, and the like.—Deutsche Erdol-A.-G. Aug. 8, 1935. 479,488.

PROCESS AND APPARATUS FOR PURIFYING CRUDE HYDROCARBONS. W. W. Triggs (Gutehoffnungshütte Oberhausen, A.-G.). Aug. 4, 1936. 479,441.

MANUFACTURE OF ETHERS of cellulose and other carbohydrates. H. F. Oxley, E. B. Thomas, and J. Downing. Aug. 5, 1936. 479,445.

MANUFACTURE OF ARYLAMINONAPHTHALENE DERIVATIVES.—I. G. Farbenindustrie. Oct. 26, 1935. 479,447.

MANUFACTURE OF IMIDAZOLINES.—E. Waldmann, and A. Chwala. April 4, 1936. 479,491.

REMOVAL OF PHENOLS from waste aqueous liquids.—G. W. Johnson (I. G. Farbenindustrie.) Aug. 5, 1936. 479,359.

Chemical and Allied Stocks and Shares

APART from British Government securities and other good-class fixed interest stocks, there has been a further downward movement in values in the stock and share markets. It is generally agreed that uncertainty as to international politics is continuing to limit business in the share and commodity markets, and that current prices of industrial securities must be considered as more than discounting the possibility of less active trade conditions. In most cases they are at levels which offer apparently attractive yields, but there is little evidence that they are likely to attract attention until market sentiment is stimulated by hopeful developments in international affairs.

Shares of chemical and allied companies were relatively steady, although, in sympathy with the general tendency, most movements were adverse to holders. Imperial Chemical at 32s. 3d. are within 4½d. of the price current a week ago. The market is talking of impending news of internal adjustments in the group making for a measure of decentralisation. Lever and Unilever ordinary units, which were a steady feature, are 37s. 6d. at the time of writing, the same as a week ago. The final dividend announcement is expected next month, and the disposition is to budget for a larger total payment for the year. Swedish Match were moderately higher at 24s. 3d. in response to anticipations that the results will show encouraging improvement in earning capacity.

Associated Portland Cement at 85s. 6d. have been well maintained, partly owing to the news that shareholders of Alpha Cement have accepted the terms of the proposed merger, and partly because of hopes that the dividend may again be brought up to 22½ per cent. British Match at 35s. are within a few pence of the price current a week ago. Pinchin Johnson improved moderately, anticipations that the dividend is likely to be maintained at 20 per cent., in accordance with the hope expressed at the last meeting of the company, having attracted a certain amount of buying. Courtaulds have been reactionary and declined to 42s. 6d. in advance of the final dividend announcement. Other textile shares also inclined to lower prices in sympathy with the surrounding trend of markets.

Borax Consolidated were fairly steady, having remained under the influence of the favourable results for the past year, and at 27s. 3d. are within 3d. of the price current a week ago. The market is hopeful it may be announced that in future the practice of paying interim dividends on the preferred shares is to be resumed. General Refractories were dull at 14s. 9d., the disposition being to await the dividend announcement, which is expected to appear in the early part of next month. Blythe Colour Works 4s. shares at 9s. and William Blythe 3s. shares at 6s. were virtually maintained. Results of these two companies also fall to be issued next month. British Oil and Cake preferred ordinary shares at 46s. 9d. were a steady feature as were Cerebos ordinary. The latter were unchangd around £8¾, reports of improved conditions in the salt trade have encouraged market anticipations that this prosperous company will again bring its dividend up to 40 per cent.

Reckitt and Sons at 107s. 6d. were also steady. This company has an excellent dividend record over a long period of years, and the assumption is that the total distribution will again be maintained at 22½ per cent. Boots Pure Drug at 46s. have not kept best prices, but these 5s. shares have, as usual, shown a fair amount of activity. Some market men are continuing to talk of the possibility of a share bonus distribution sooner or later.

United Steel Companies ordinary units at 25s. 1½d. regained part of an earlier decline, while Richard Thomas 6s. 8d. shares were a better market on the chairman's detailed statement as to the company's position and outlook.

Weekly Prices of British Chemical Products

A MODERATELY active movement of chemicals has been reported during the past week, the demand being more or less restricted to products normally enjoying a regular call. There have been no important price changes and values for most descriptions continue steady, with a firm undertone.

There has been a steady movement of heavy acids, and a fair inquiry has been maintained for acetone and formaldehyde. In the soda products, bichromate and chlorate are moderately active items. Quotations for most of the lead compounds continue at recent levels, but the convention prices for lead oxides are lower in sympathy with the lower value of the metal. Buying interest in the coal tar products is definitely slow and actual business during the past week has been on a very moderate scale. On the whole, however, the market is disposed to take a cheerful view of prospects.

MANCHESTER.—Reports from traders on the Manchester chemical market during the past week have been rather conflicting. Most people agree that fresh business in heavy products is on moderate lines and chiefly confined to small parcels for near delivery positions. Whilst, however, in a number of instances satisfaction is expressed at the way in which delivery specifications against contracts are coming forward, other traders are not too well placed in this respect, largely in consequence of a falling off in the quantities of textile chemicals that are being taken up. In the by-products market easiness of prices remains a feature of most sections, and whilst the uncertainty regarding future market movements continues, buyers are disposed to abstain from entering into commitments of much importance.

GLASGOW.—Business in chemicals has continued very quiet during the week, both for home trade and export. Prices all remain very steady at about previous figures, with no important changes to report.

Price Changes

Rises: Lithopone.

Falls: Lead, red; Mercury; Cadmium Sulphide; Carbon black; Creosote (Manchester); Pitch (Manchester).

General Chemicals

ACETONE.—**£45 to £47 per ton.**

ACETIC ACID.—Tech, 80%, £30 5s. per ton; pure 80%, £32 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 2s. 6d. per ton d/d Lancs. GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 1s. to 1s. 1d. per lb. d/d in cylinders. SCOTLAND: 10½d. to 1s. 0½d., containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—Grey galvanising, £19 per ton, ex wharf.

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM DICHROMATE.—8¼d. per lb. d/d U.K.

ANTIMONY OXIDE.—£68 per ton.

ARSENIC.—Continental material £11 per ton c.i.f., U.K. ports; Cornish White, £12 5s. to £12 10s. per ton f.o.r., mines, according to quantity. MANCHESTER: White powdered Cornish, £16 10s. per ton, ex store.

BARIUM CHLORIDE.—£11 10s. to £12 10s. per ton in casks ex store. GLASGOW: £11 10s. per ton.

BLEACHING POWDER.—Spot, 35/37%, £9 15s. per ton in casks, special terms for contracts. SCOTLAND: £9 per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

BORIC ACID.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

CALCIUM BISULPHITE.—£6 10s. per ton f.o.r. London.

CHARCOAL, LUMP.—£6 to £6 10s. per ton, ex wharf. Granulated, £7 to £9 per ton according to grade and locality.

CHROMETAN.—Crystals, 2¼d. per lb.; liquor, £19 10s. per ton d/d station in Drums. GLASGOW: 70/75% solid, £5 15s. per ton net ex store.

CHROMIC ACID.—9¼d. per lb., less 2½%; d/d U.K.

CHROMIUM OXIDE.—11d. per lb.; d/d U.K.

CITRIC ACID.—1s. 0¼d. per lb. MANCHESTER: 1s. 0½d. SCOTLAND: B.P. crystals, 1s. 0½d. per lb.; less 5%, ex store.

COPPER SULPHATE.—£21 7s. 6d. per ton, less 2% in casks. MANCHESTER: £19 10s. per ton f.o.b. SCOTLAND: £19 5s. per ton, less 5%, Liverpool, in casks.

CREAM OF TARTAR.—100%, 92s. per cwt., less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£20-£22 per ton.

FORMIC ACID.—85%, in carboys, ton lots, £42 to £47 per ton.

GLYCERINE.—Chemically pure, double distilled, 1.260 s.g., in tins, £4 17s. 6d. to £5 17s. 6d. per cwt. according to quantity; in drums, £4 10s. 6d. to £5 3s. 6d.

HYDROCHLORIC ACID.—Spot, 5s. 6d. to 8s. carboy d/d according to purity, strength and locality.

IODINE.—Resublimed B.P., 6s. 4d. per lb. in 7 lb. lots.

LACTIC ACID.—(Not less than ton lots) Dark, 50% by volume, £21 10s.; by weight, £27 10s.; Pale, 50% by volume, £27; by weight, £32 per ton. LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One-ton lots ex works, barrels free.

LEAD ACETATE.—LONDON: White, £31 10s. ton lots; brown, £35. GLASGOW: White crystals, £31 10s.; brown, £1 per ton less. MANCHESTER: White, £33; brown, £32.

LEAD, NITRATE.—£32 per ton for 1-ton lots.

LEAD, RED.—£31 15s. 0d. 10 cwt. to 1 ton, less 2½% carriage paid. SCOTLAND: £31 per ton, less 2½% carriage paid for 2-ton lots.

LITHARGE.—SCOTLAND: Ground, £31 per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 10s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf.

MERCURY.—Ammoniated B.P. (white precip.), lump, 5s. 10d. per lb.; powder B.P., 6s. 0d.; bichloride B.P. (corros. sub.) 5s. 1d.; powder B.P. 4s. 9d.; chloride B.P. (calomel), 5s. 10d.; red oxide cryst. (red precip.), 6s. 11d.; levig. 6s. 5d.; yellow oxide B.P. 6s. 3d.; persulphate white B.P.C., 6s. 0d.; sulphide black (hyd. sulph. cum sulph. 50%), 5s. 11d. For quantities under 112 lb., 1d. extra; under 28 lb., 5d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NITRIC ACID.—Spot, £25 to £30 per ton according to strength, quantity and destination.

OXALIC ACID.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 to £54 per ton ex store.

PARAFFIN WAX.—SCOTLAND: 3¾d. per lb.

POTASH CAUSTIC.—Solid, £35 5s. to £36 15s. per ton for 2-ton lots ex store; broken, £42 per ton. MANCHESTER: £39.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4¼d. per lb. MANCHESTER: £37 10s. per ton.

POTASSIUM DICHROMATE.—5¼d. per lb. carriage paid. SCOTLAND: 5¼d. per lb., net, carriage paid.

POTASSIUM IODIDE.—B.P. 5s. 6d per lb. in 7 lb. lots.

POTASSIUM NITRATE.—Small granular crystals, £24 to £27 per ton ex store, according to quantity. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9¾d. per lb. SCOTLAND: B.P. Crystals, 9¾d. MANCHESTER: B.P. 11d. to 1s.

POTASSIUM PRUSSIATE.—6¼d. per lb. SCOTLAND: 7d. net, in casks, ex store. MANCHESTER: Yellow, 6¼d.

SALAMMONIAC.—Firsts lump, spot, £42 17s. 6d. per ton, d/d address in barrels. Dog-tooth crystals, £36 per ton; fine white crystals, £18 per ton, in casks, ex store. GLASGOW: Large crystals, in casks, £37 10s.

SALT CAKE.—Unground, spot, £3 10s. 6d. per ton.

SODA ASH.—58% spot, £5 17s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid. 76/77° spot, £14 per ton d/d station. SCOTLAND: Powdered 98/99%, £18 10s. in drums, £19 5s. in casks, Solid 76/77° £15 12s. 6d. in drums; 70/73%, £15 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts, 10s. per ton less.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE.—£19-£20 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.
SODIUM BICARBONATE.—Refined spot, £10 15s. per ton d/d station in bags. GLASGOW: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags. MANCHESTER: £10 10s.
SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.
SODIUM CARBONATE MONOHYDRATE.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.
SODIUM CHLORATE.—£27 10s. to £32 per ton. GLASGOW: £1 11s. per cwt., minimum 3 cwt. lots.
SODIUM DICHROMATE.—Crystals cake and powder 4½d. per lb. net d/d U.K. with rebates for contracts. MANCHESTER:
SODIUM CHROMATE.—4½d. per lb. d/d U.K.
4d. per lb. GLASGOW: 4½d. net, carriage paid.
SODIUM HYPOSULPHITE.—Pea crystals, £15 5s. per ton for 2-ton lots; commercial, £11 5s. per ton. MANCHESTER: Commercial, £11; photographic, £15 10s.
SODIUM METASILICATE.—£14 5s. per ton, d/d U.K. in cwt. bags.
SODIUM NITRATE.—Refined, £8 per ton for 6-ton lots d/d. GLASGOW: £1 12s 0d. per cwt. in 1-cwt kegs, net, ex store.
SODIUM NITRITE.—£18 5s. per ton for ton lots.
SODIUM PERBORATE.—10%, 9½d. per lb. d/d in 1-cwt. drums.
SODIUM PHOSPHATE.—Di-sodium, £12 per ton delivered for ton lots. Tri-sodium, £15 to £16 per ton delivered per ton lots.
SODIUM PRUSSIATE.—5d. per lb. for ton lots. GLASGOW: 5d. to 5¾d ex store. MANCHESTER: 4¾d. to 5d.
SODIUM SILICATE.—£9 10s. per ton.
SODIUM SULPHATE (GLAUBER SALTS).—£3 per ton d/d.
SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 to £3 10s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 12s. 6d.
SODIUM SULPHIDE.—Solid 60/62%. Spot, £11 15s. per ton d/d in drums; crystals, 30/32%, £9 per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 10s.
SODIUM SULPHITE.—Pea crystals, spot, £14 10s. per ton d/d station in kegs.
SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.
SULPHURIC ACID.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.
TARTARIC ACID.—1s. 1½d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1½d. per lb. GLASGOW: 1s. 1d. per lb., 5%, ex store.
WHITE SUGAR OF LEAD.—£31 10s. per ton net.
ZINC SULPHATE.—Tech., £11 10s. f.o.r., in 2 cwt. bags.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 7d. to 1s. 2d. per lb., according to quality. Crimson, 1s. 6d. to 1s. 7½d. per lb.
ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.
BARYTES.—£6 to £6 10s. per ton, according to quality.
CADMIUM SULPHIDE.—6s. 6d. to 6s. 9d. per lb.
CARBON BLACK.—4d. per lb., ex store.
CARBON DISULPHIDE.—£31 to £33 per ton, according to quantity, drums extra.
CARBON TETRACHLORIDE.—£41 to £46 per ton, according to quantity, drums extra.
CHROMIUM OXIDE.—Green, 10½d. to 11d. per lb.
DIPHENYLGUANIDINE.—2s. 2d. per lb.
INDIA-RUBBER SUBSTITUTES.—White, 4½d. to 5½d. per lb.; dark 4d. to 4½d. per lb.
LAMP BLACK.—£24 to £26 per ton del., according to quantity. Vegetable black, £35 per ton upwards.
LEAD HYPOSULPHITE.—9d. per lb.
LITHOPONE.—30%, £17 to £17 15s. per ton.
SULPHUR.—£9 to £9 5s. per ton. SULPHUR PRECIP. B.P., £55 to £60 per ton. SULPHUR PRECIP. COMM., £50 to £55 per ton.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quantity.
VERMILION.—Pale, or deep, 5s. per lb., 1-cwt. lots.
ZINC SULPHIDE.—£58 to £60 per ton in casks ex store, smaller quantities up to 1s. per lb.

Nitrogen Fertilisers

AMMONIUM SULPHATE.—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1938: November, £7 8s.; December, £7 9s. 6d.; January, 1938, £7 11s.; February, £7 12s. 6d.; March/June, £7 14s.
CALCIUM CYANAMIDE.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1938: November, £7 10s.; December, £7 11s. 3d.; January, 1938, £7 12s. 6d.; February, £7 13s. 9d.; March, £7 15s.; April/June, £7 16s. 3d.
NITRO CHALK.—£7 10s. 6d. per ton up to June 30, 1938.
SODIUM NITRATE.—£8 per ton for delivery up to June 30, 1938.
CONCENTRATED COMPLETE FERTILISERS.—£11 4s. to £11 13s. per ton in 6-ton lots to farmer's nearest station.
AMMONIUM PHOSPHATE FERTILISERS.—£10 19s. 6d. to £14 16s. 6d. per ton in 6-ton lots to farmer's nearest station.

Coal Tar Products

BENZOL.—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3d. to 1s. 3½d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 8d. to 1s 8½d. GLASGOW: Crude, 10d. to 10½d. per gal.; motor, 1s. 4d. to 1s. 4½d.
CARBOLIC ACID.—Crystals, 7¾d. to 8½d. per lb., small quantities would be dearer; Crude, 60's, 3s. 9d. to 4s.; dehydrated, 4s. 4½d. to 4s. 7½d. per gal. MANCHESTER: Crystals, 8d. per lb. f.o.b. in drums; crude, 3s. 3d. to 3s. 6d. per gal.
CREOSOTE.—Home trade, 6½d. to 6¾d. per gal., f.o.r. makers' works; exports, 6¾d. to 6¾d. per gal., according to grade. MANCHESTER: 4½d. to 5½d. GLASGOW: B.S.I. Specification, 6d. to 6¼d. per gal.; washed oil, 5d. to 5¼d.; lower sp. gr. oils, 5¾d. to 6¼d.
CRESYLIC ACID.—97/99%, 3s. 4½d. to 3s. 7½d.; 99/100%, 5s. to 5s. 6d. per gal., according to specification; Pale, 99/100%, 3s. 8½d. to 3s. 11½d.; Dark, 95%, 3s. to 3s. 1d. per gal. GLASGOW: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale, 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. to 2s. 6d. American specification, 3s. 9d. to 4s. MANCHESTER: Pale, 99/100%, 3s. 3d.
NAPHTHA.—Solvent, 90/160, 1s. 6¼d. to 1s. 7½d. per gal.; solvent, 95/160%, 1s. 7d. to 1s. 8d., naked at works; heavy 90/190%, 1s. 1½d. to 1s. 3d. per gal., naked at works, according to quantity. GLASGOW: Crude, 6¼d. to 7¼d. per gal.; 90%, 160, 1s. 5d. to 1s. 6d., 90%, 190, 1s. 1d. to 1s. 3d.
NAPHTHALENE.—Crude, whizzed or hot pressed, £6 10s. to £7 10s. per ton; purified crystals, £15 10s. per ton in 2-cwt. bags. LONDON: Fire lighter quality, £5 10s. to £7 per ton. GLASGOW: Fire lighter, crude, £6 to £7 per ton (bags free). MANCHESTER: Refined, £17 per ton f.o.b.
PITCH.—Medium, soft, 35s. to 37s. per ton, f.o.b. MANCHESTER: 32s. 6d. f.o.b., East Coast. GLASGOW: f.o.b. GLASGOW: 35s. to 37s. per ton; in bulk for home trade, 35s.
PYRIDINE.—90/140%, 13s. 6d. to 15s. per gal.; 90/160%, 10s. to 13s. 3d. per gal.; 90/180%, 3s. 3d. to 4s. per gal. f.o.b. GLASGOW: 90% 140, 10s. to 12s. per gal.; 90% 160, 9s. to 10s.; 90% 180, 2s. 6d. to 3s. MANCHESTER: 12s. 6d. to 14s. per gal.
TOLUOL.—90%, 1s. 10d. to 1s. 11d. per gal.; pure, 2s. 2d. to 2s. 3d. GLASGOW: 90%, 120, 1s. 10d. to 2s. 1d. per gal.
XYLOL.—Commercial, 2s. 1d. to 2s. 2d. per gal.; pure, 2s. 3d. to 2s. 4d. GLASGOW: Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

CALCIUM ACETATE.—Brown, £7 10s. to £8 per ton; grey, £9 10s. to £10. Liquor, brown, 30° Tw., 6d. to 8d. per gal. MANCHESTER: Brown, £9 10s.; grey, £11 10s.
METHYL ACETONE.—40.50%, £35 to £40 per ton.
WOOD CREOSOTE.—Unrefined, 4d. to 8d. per gal., according to boiling range.
WOOD NAPHTHA, MISCIBLE.—3s. 3d. to 3s. 6d. per gal.; solvent, 3s. 6d. to 3s. 9d. per gal.
WOOD TAR.—£2 to £8 per ton, according to quality.

Intermediates and Dyes

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZIDINE, HCl.—2s. 7½d. per lb., 100% as base, in casks.
BENZOIC ACID, 1914 B.P. (ex toluol).—1s. 11d. per lb. d/d buyer's works.
m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.
o-CRESOL 30/31° C.—6½d to 7½d. per lb. in 1-ton lots.
p-CRESOL, 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.
DICHLORANILINE.—2s. 1½d. to 2s. 5½d. per lb.
DIMETHYLANILINE.—Spot, 1s. 7½d. per lb., package extra.
DINITROBENZENE.—8¼d. per lb.
DINITROCHLORBENZENE, SOLID.—£79 5s. per ton.
DINITROTOLUENE.—48/50° C., 9½d. per lb.; 66/68° C., 11d.
DIPHENYLAMINE.—Spot, 2s. 2d. per lb., d/d buyer's works.
GAMMA ACID, Spot, 4s. 4½d. per lb. 100% d/d buyer's works.
H ACID.—Spot, 2s. 7d. per lb.; 100% d/d buyer's works.
NAPHTHIONIC ACID.—1s. 10d. per lb.
β-NAPHTHOL.—£97 per ton; flake, £94 8s. per ton.
α-NAPHTHYLAMINE.—Lumps, 1s. 1d. per lb.
β-NAPHTHYLAMINE.—Spot, 3s. per lb.; d/d buyer's works.
NEVILLE AND WINTHER'S ACID.—Spot, 3s. 3½d. per lb. 100%.
o-NITRANILINE.—4s. 3½d. per lb.
m-NITRANILINE.—Spot, 2s. 10d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 10d. to 2s. 3½d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.
NITRONAPHTHALENE.—10½d. per lb.; P.G., 1s. 0½d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 11d. per lb.; 100% d/d buyer's works.
SULPHANILIC ACID.—Spot, 8¾d. per lb. 100%, d/d buyer's works.
o-TOLUIDINE.—11½d. per lb., in 8/10-cwt. drums, drums extra.
p-TOLUIDINE.—2s. per lb., in casks.
m-XYLIDINE ACETATE.—4s. 8d. per lb., 100%.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

ISTEG STEEL PRODUCTS, LTD., London, E.C. (M., 19/2/38.) February 4, £10,000 debenture, to Branch Nominees, Ltd.; general charge. *Nil. May 18, 1937.

Satisfactions

E. P. BRAY AND CO., LTD., Welwyn Garden City, manufacturers of synthetic resin products. (M.S., 19/2/38.) Satisfaction February 5, £200, registered July 23, 1937.

Receivers Ceasing to Act

SWANSON'S PRODUCTS, LTD., Salford, chemical manufacturers. S. B. McQueen. January 21.

Private Arrangement

GEOFFREY HOLLAND, trading as Paramount Laboratories, 17 Hullard Street, Manchester.—The creditors met recently at the Victoria Hotel, Deansgate, Manchester, when the statement of affairs showed ranking liabilities of £1,535, of which £1,045 was due to the trade and the balance of £489 to cash creditors. There was also a fully secured creditor for £93. After allowing £31 for preferential claims the net assets were £78, or a deficiency of £1,456. A deficiency account was submitted which showed that on August 1, 1937, the debtor's capital account was in debit to the extent of £593. During the year to July 31, 1936, the turnover was £1,229, with a gross profit of £226, and a net loss of £378. In the following twelve months the turnover increased to £3,510, the gross profit went up to £1,098, and there was a net profit of £30. During the period to February 8, of the present year the sales were £1,725, on which a gross profit was earned of £503, but there was a net loss of £191. It was decided that the matter should be dealt with under a deed of assignment already executed to Mr. C. Green, whilst a committee was also appointed.

Company News

Sadler and Co., manufacturing chemists, announces a special cash distribution of 1s. 3d. per share, or 6¼ per cent., not subject to tax, paid January 31.

Associated Clay Industries announces a final dividend of 5 per cent. plus bonus of 2 per cent., making 10 per cent., less tax, for 1937 (compared with 6 per cent. for previous nine months).

Fairy Dyes, Ltd., in their report for the year to November 30 show profit £2,827, against loss of £6,059; income-tax recovered £1,200, dividend on preference shares for year to May 31, 1937, £2,700, directors' and auditors' fees, £757 (same); written off trade marks, etc., £570 (nil); £2,488 (same) forward.

Norge A/S, the Norwegian whaling company, reports for the year 1937 a net trading profit of Kr.1,000,000. The board recommends a dividend of 30 per cent., absorbing Kr.390,000, to provide for depreciation Kr.277,000 and for taxation Kr.200,000, to transfer Kr.155,000 to different funds and to carry forward Kr.39,000.

Minerals Separation, Ltd., announces a sharp increase in net profits, before tax, of £100,533, to £158,023 in 1937. Provision for taxation takes £18,500, against £2,000, this year's figure including National Defence Contribution, while directors' additional remuneration requires £7,251, against £2,374. The final dividend is 30 per cent., making 50 per cent., against 25 per cent., leaving the carry-forward up from £38,484 to £70,756.

New Companies Registered

Industrial Gases (Scotland), Ltd. 20,171.—Private company. Capital, £20,000 in £1 shares. To carry on the business of manufacturers and producers of oxygen, nitrogen, hydrogen, argon, neon, helium, acetylene, carbon dioxide, etc. Directors: D. A. Irvine, 37 Fitzjohn Avenue, Barnet, Hertfordshire; E. Carnegie, Thomas P. McNaught.

John Lauder (Chemists), Ltd. 336,525.—Private company. Capital £1,500 in £1 shares. To carry on business as manufacturers of and dealers in chemicals, gases, drugs, medicines, etc. Directors: John Lauder, Southbourne, near Emsworth, Hants.; Renee D. Lauder, Ernest Love, Emily M. Love. Registered office: Church Corner House, Southbourne, near Emsworth.

Forthcoming Events

February 21-March 4.—British Industries Fair at Olympia and Earl's Court, London, and Castle Bromwich, Birmingham.

London.

February 21.—University College, Gower Street, W.C.1. 5 p.m. Dr. H. R. Ing, "Chemical Structure and Pharmacological Action."

University of London. Imperial College of Science and Technology, Imperial Institute Road, South Kensington, S.W.7. 5.15 p.m. Dr. W. P. Jorissen, "Reactions in Gaseous and Solid Mixtures."

February 23.—Institution of Chemical Engineers. Graduates' and Students' Section. C. R. Barsley, "Chemical Engineering in the Foodstuff Industry."

February 24.—The Royal Institution of Great Britain, 21 Albemarle Road, W.1. 5.15 p.m. H. W. Melville, "The Mechanism of Gaseous Chemical Reactions."

British Chemical Plant Manufacturers' Association. Annual Dinner, Jules Restaurant, Jermyn Street. 7 p.m. Dr. A. P. M. Fleming. "The Organisation of Research in a Works."

February 28.—Royal Society of Arts, John Street, Adelphi, W.C.2. 8 p.m. (Cantor Lecture). Colin J. Smithells, "Gases and Metals" (Lecture 1.)

University College, Gower Street, W.C.1. 5 p.m. Dr. J. F. Danielli, "Surface Chemistry and Biology."

Derby.

February 22.—British Association of Chemists. Cavendish Cafe, Messrs. Sowter and Stanbridge. "Paper Making" and "New Artificial Silicates."

Glasgow.

February 24.—Institute of Vitreous Enamellers. Royal Technical College. 7.30 p.m. James Jackson, "Colour and its Effects on the Appearance of Enamelled Ware."

Hull.

March 1.—Hull Chemical and Engineering Society. Hull Photographic Society's Room, Grey Street, Park Street. 7.45 p.m. E. L. Holmes, "New Processes in Water Treatment."

Newcastle.

February 22.—N.E. Joint Chemical Societies' Dinner.

Swansea.

February 25.—Chemical Engineering Group. Joint Meeting with the South Wales Section. Royal Metal Exchange, Fisher Street, Swansea. 7.30 p.m. Vernon Harbord, "Metals in Chemical Engineering."

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

British India.—The Director-General, India Store Department, Belvedere Road, Lambeth, London, S.E.1, invites tenders for 45 tons ferro-manganese. Tenders due, March 8, 1938. Forms of tender obtainable from the above at a fee of 5s.

Canada.—A well-established firm of agents at Winnipeg wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of pumps operating with both pump and motor completely submerged, for the provinces of Manitoba, Saskatchewan and Alberta. (Ref. No. 109.)

South Africa.—An agent established at Johannesburg wishes to obtain the representation of United Kingdom manufacturers of chloride of lime, caustic soda, chalk in lumps and sticks. (Ref. No. 111.)

Czechoslovakia.—An agent established at Prague wishes to obtain the sole representation, on a commission basis, of United Kingdom suppliers of tanning extracts and barks (wattle, gambier, Quebracho, etc.); Casein (edible and industrial). Ref. No. 117.)

Austria.—A firm of chemical manfacturers and dealers established at Vienna wish to obtain the representation of the U.K. producers or exporters of chemical products for the following industries: paper, textile, leather, rubber, glass, ceramics, oil, fat, candle, soap, match, iron, non-ferrous metal, electrical, colours and foodstuffs, as well as for dyers and laundries. Purchases would in some cases be made for own account. (Ref. No. 116.)

Books Received

The Chemistry and Technology of Rubber Latex. By C. Falconer Flint. London: Chapman and Hall, Ltd. Pp. 715. 42s.

Der Gaskampf und die chemischen Kampfstoffe. By Dr. Phil. Julius Meyer. Leipzig: Verlag Von S. Hirzel. Pp. 376. 13.50 RM.

The Fine Structure of Matter. Part II. Molecular Polarization. By C. H. Douglas Clark. Vol. II. London: Chapman and Hall, Ltd. Pp. 457. 15s.